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ABSTRACT

These documents provide background information and a series of problems and activities to familiarize students with important maritime activities in the United States. Book I contains problems involving the movement of freight on inland waterways, questions on energy and the environment, and a chart with questions on United States oil imports. Book II features information on hydroelectric power, water transportation, and energy consumption. The third book traces the history and influence of the sea on America and discusses shipbuilding, trading, commercial fishing, leisure time, and the arts. The growing interest in marine science and the development of maritime parks and museums are noted. Annotated lists of pertinent periodicals, books, pamphlets, and films are included. (KC)

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AMERICA'S MARITIME HERITAGE:

From Sail Power to Nuclear Power

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

BOOK I

by

Wm. Ray Heitzmann, Ph.D.

AN ENERGY EDUCATION ACTIVITY BOOK

Published by:
Con-Stran Productions
River Park Building, Suite 2108
3600 Conshohocken Avenue
Philadelphia, Pa. 19131

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3. Most freight on the inland waters moves in barges. Groups of these are either pulled or pushed by towing vessels. The capacity of the barges generally falls between 500 and 3,000 tons; they carry both liquid and dry. In terms of energy, utilization, this is the most efficient mode of transportation:

water freight - 500 BTU per ton-mile
rail freight - 750 BTU per ton-mile
pipelines - 1,850 BTU per ton-mile
trucks - 2,400 BTU per ton-mile
air cargo - 6,300 BTU per ton-mile

In relation to air cargo, how many times more efficient is water freight per ton-mile? _____

4. The United States has over 25,000 miles of navigable inland waterways. The following chart explains the length and depth of these waterways.

Area	Depth					
	Under 6 ft.	6 to 9 ft.	9 to 12 ft.	12 to 14 ft.	14 ft. and over	Total
Atlantic Coast	1,426	1,241	584	938	1,581	5,768
Atlantic Intra-Coastal Waterway (Norfolk, Va. - Key West, Fla.		65	65	1,104		1,234
Gulf Coast	2,055	647	1,133	79	378	4,292
Gulf Intra-Coastal Waterway (St. Marks River, Fla. - Mexican Border)				1,137		1,137
Mississippi River System	2,020	969	4,957 237	740	268	8,954
Pacific Coast	730	498		26	2,084	3,575
Great Lakes	45	89		8	348	490
Others (excluding Alaska)	76	7		1	7	91
Grade Total	6,352	3,516	6,376	4,033	4,666	25,543

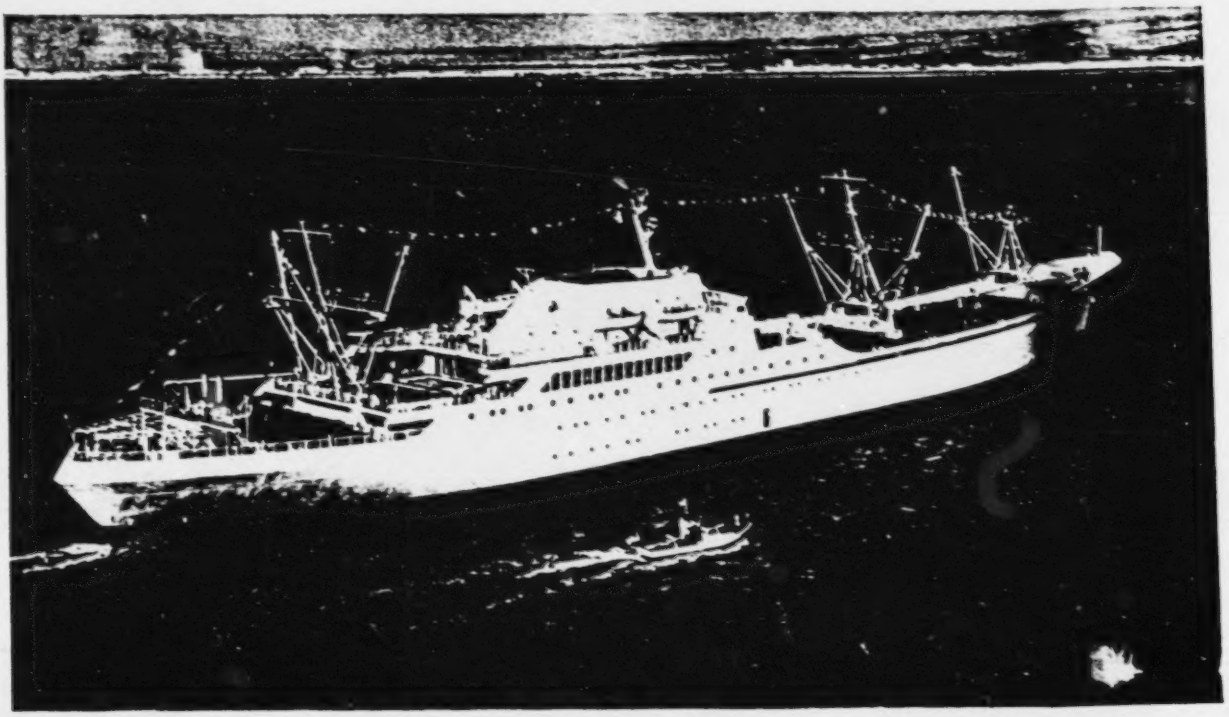
If you were piloting a boat that needed a depth of 11.5 feet of water in which to travel, how many miles of navigable waterways would be safely available to you? _____ If you lived in the Pacific coastal area, how many miles would be available to you? _____

DAILY NEWS, TUESDAY, JANUARY 4, 1977

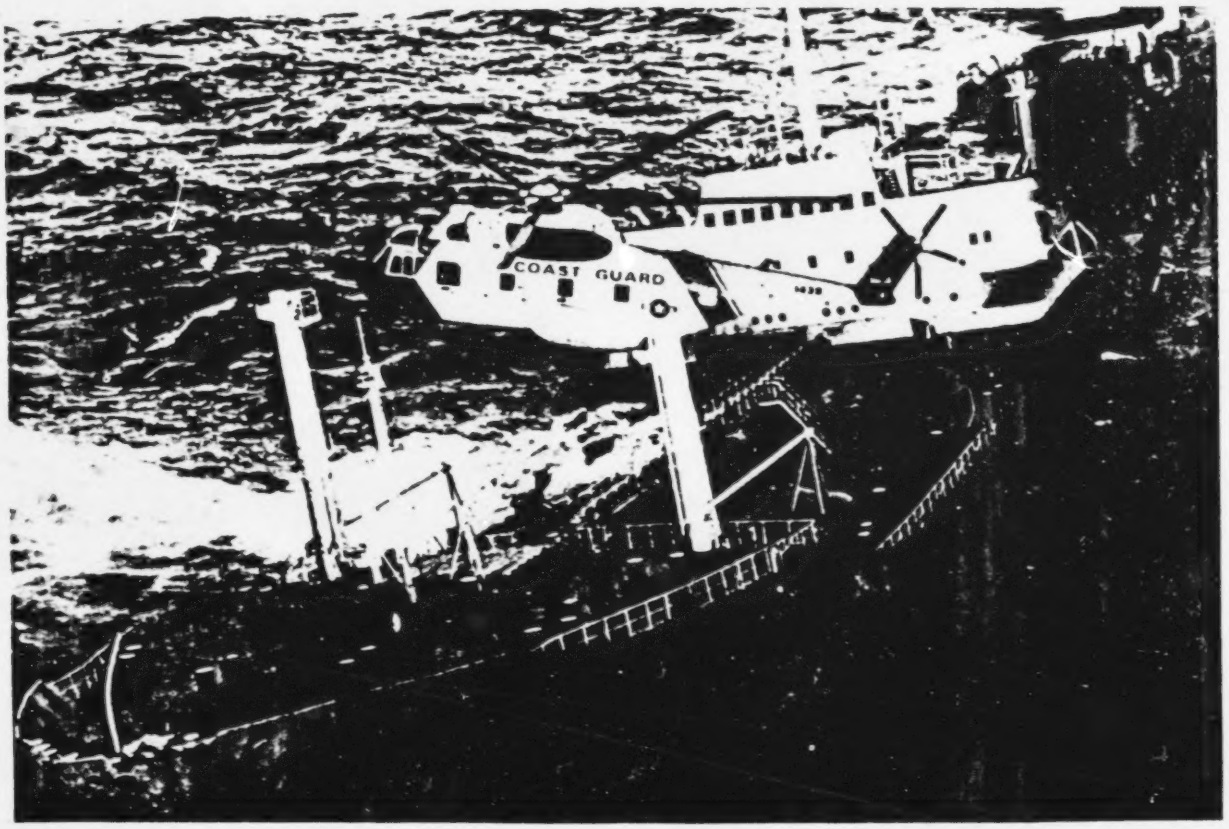
Energy Education "Believe It"

In the Bay of Fundy (Maine), the tides rise as much as 50 feet! A tidal generating plant, if built, could yield 7 1/2 billion KWH -- enough to provide power to 700,000 homes!

9. Choose one of the topics related to the subject of this box(America's Maritime Heritage and Energy) and draw a cartoon below.



SS SAVANNAH (U.S. Nuclear Merchant Ship)
(First Nuclear Merchant Vessel in the World)



ARGO MERCHANT (Liberian Oil Tanker) (Off Nantuket, Mass.) Official U.S. Coast Guard Photograph (Photographed December 15, 1976)

ENERGY AND THE ENVIRONMENT

Unfortunately some of the recreational activities of Americans today have been slowed or changed because of the problems of water pollution and scarcity of certain sources of energy.

1. What are two sources of water pollution? a. _____

   b. _____

2. What two activities does this effect?

   a. _____ b. _____

3. What two effects does the lack of energy have on water-related recreational activities? a. _____

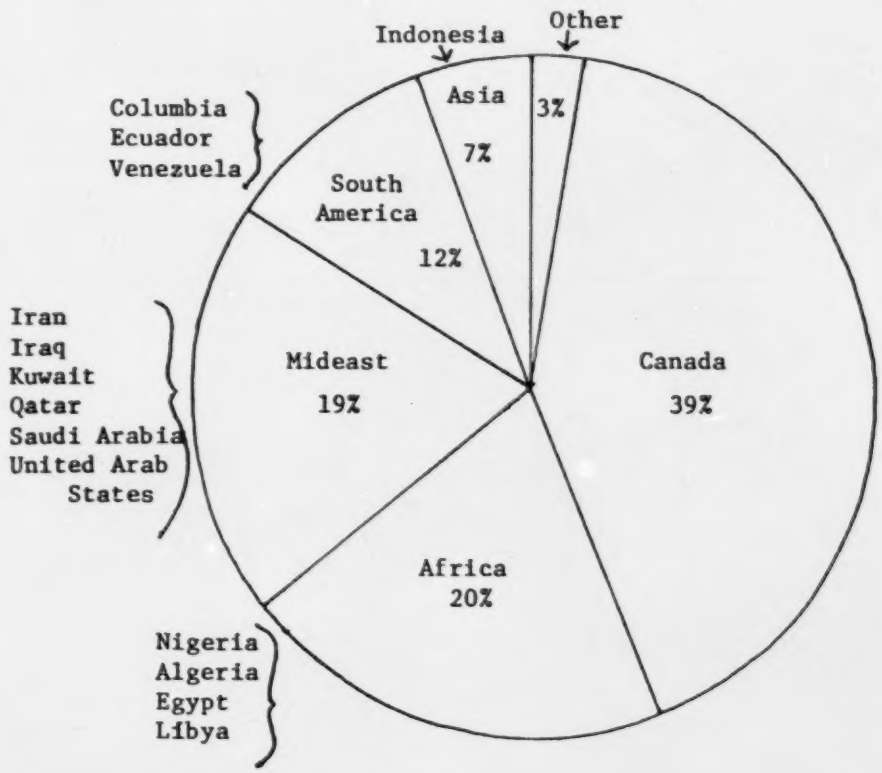
   b. _____

4. The picture above shows the Argo Merchant, a large oil tanker, about to split in half and sink. This tragedy, along with several others like it, captured the attention of all Americans.

What two suggestions can you suggest to avoid situations like the above? a. _____

b. _____

5. The United States imports oil using large tankers, pipe lines, tank trucks and barges accounting for almost fifty (50) per cent of the nation's consumption.



Using the above answer the following questions.

a. Locate on a map all of the countries from which the U.S. obtains oil.

b. How much oil comes from Africa, Asia and Latin America combined?

_____.

c. Which country provides the most oil? _____

AMERICA'S MARITIME HERITAGE:

From Sail Power to Nuclear Power

BOOK II

by

Wm. Ray Heitzmann, Ph.D.

AN ENERGY EDUCATION ACTIVITY BOOK

Published by:
Con-Stran Productions
River Park Building, Suite 2108
3600 Conshohocken Avenue
Philadelphia, Pa. 19131

ENERGY AND THE SEA: NEW SOURCES

The future of the United States is closely related to the solution of providing energy. One of the most important problems facing the nation and all its citizens is finding alternate forms of and new sources of energy and using these in our homes, schools, offices, factories, stores, and transportation vehicles. In addition, everyone must learn to use less outside energy in their own lives.

1. There exist essentially two kinds of energy - continuous and non-renewable. The following is a list of energy sources; underline those that are continuous:

a) coal
b) tidal
c) oil
d) geothermal
e) hydroelectric
f) ocean currents
g) nuclear
h) wood
i) wind
j) solar
k) ocean thermal

2. From the list above choose those energy forms that are either directly or indirectly related to water: _____

_____

_____

3. Water has provided power since the beginning of people's activities on earth. For example, when manufacturing first began, streams and rivers provided the energy to curn waterwheels for factories. Hydroelectric power presently provides only a small part of the nation's energy needs. What is hydroelectric power? _____

_____

_____

_____

HYDROELECTRIC POWER - WATER ENERGY

Parker Dam Arizona U.S. Department of the Interior (photograph)

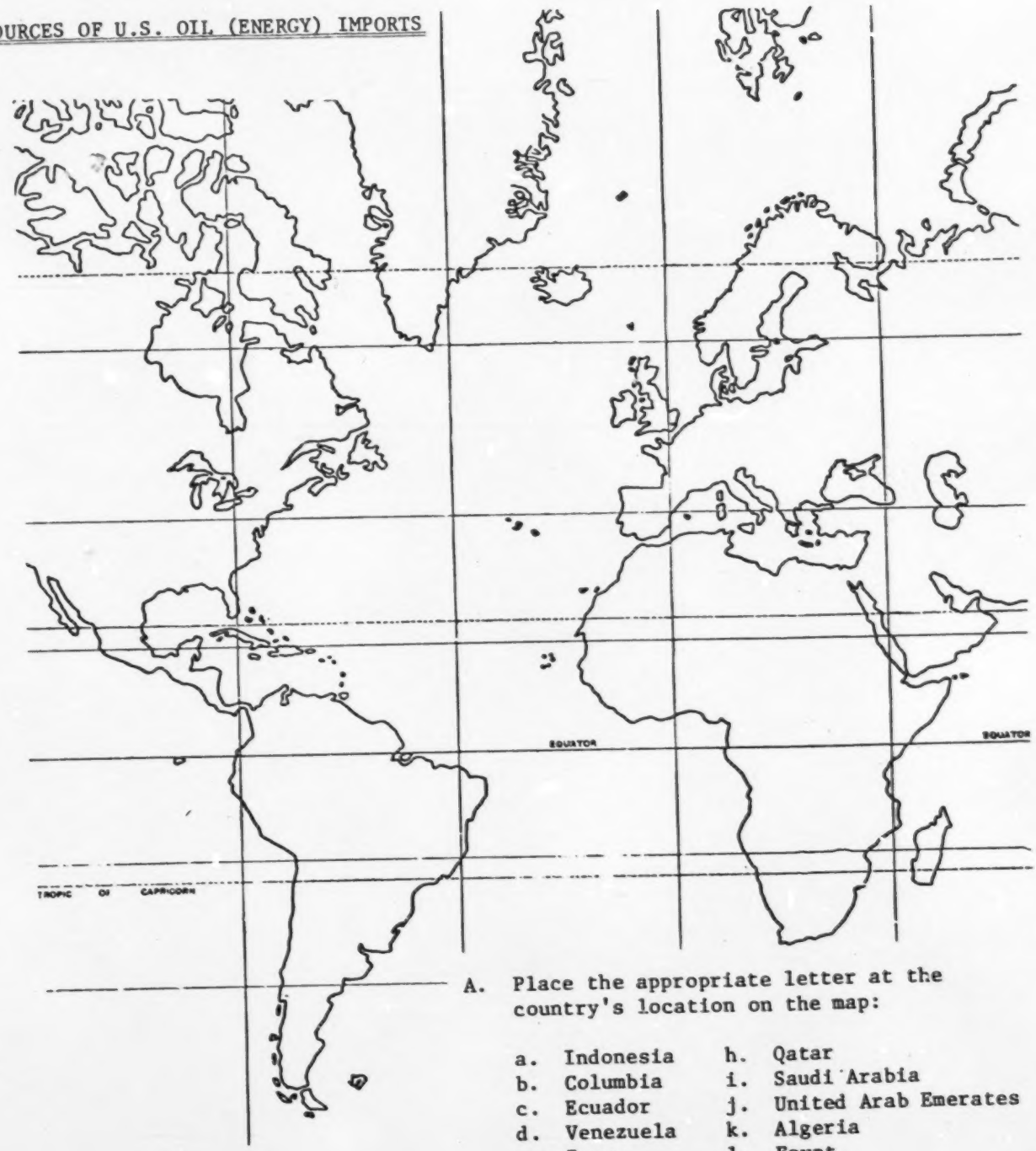
This dam, located on the Colorado River, serves several purposes. List three values of a project such as this: _____

_____

_____

_____

SOURCES OF U.S. OIL (ENERGY) IMPORTS

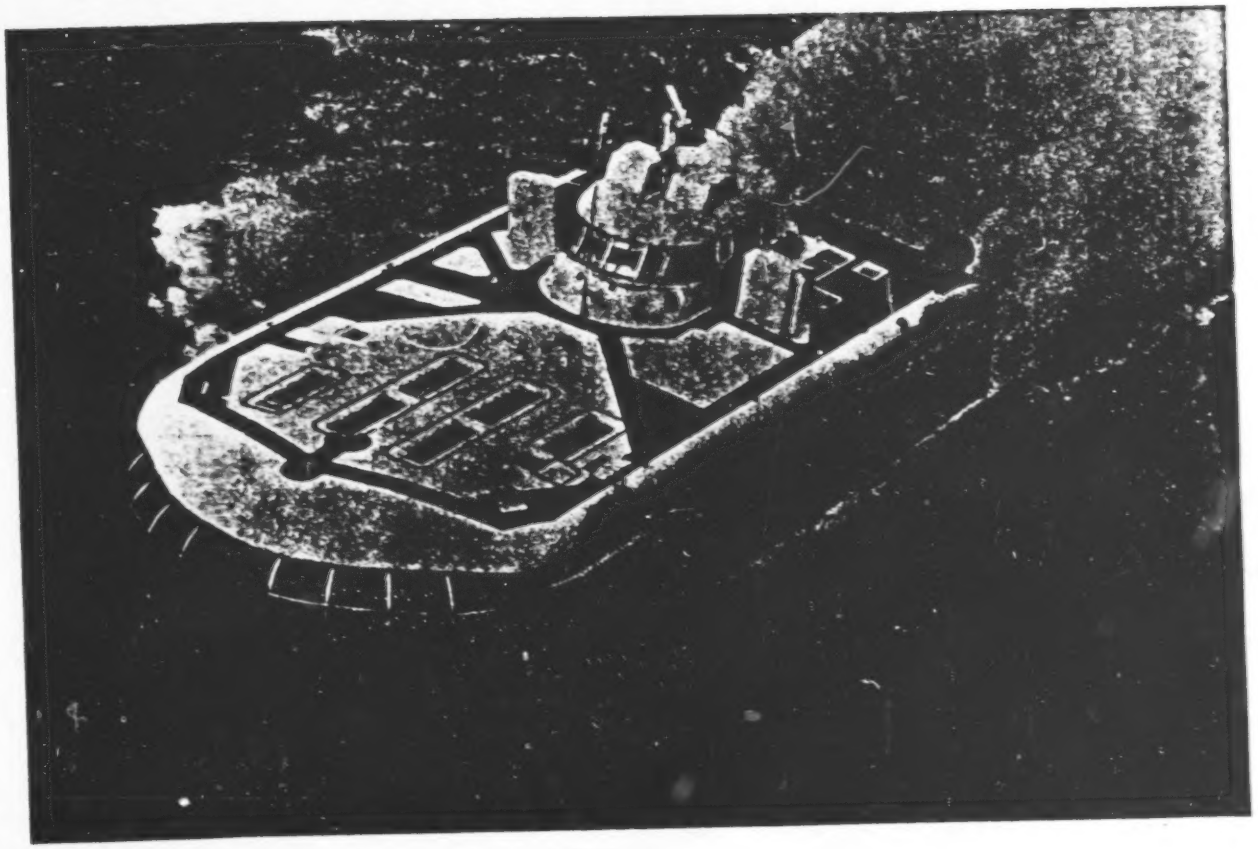


A. Place the appropriate letter at the country's location on the map:

a. Indonesia
b. Columbia
c. Ecuador
d. Venezuela
e. Iran
f. Iraq
g. Kuwait
h. Qatar
i. Saudi Arabia
j. United Arab Emerates
k. Algeria
l. Egypt
m. Libya
n. Nigeria

B. What implications do the sources of oil have for U.S. sea power?

WATER TRANSPORTATION AND ENERGY CONSUMPTION



U. S. Navy Surface Effect Ship U. S. Navy Photograph

The above ship was photographed as she engaged in high speed practice off Panama City, Florida. The ship set a record speed of 103.038 miles per hour (June 30, 1976). While today's ships generally run faster, they also cost more to operate than sailing ships. Why? _____

_____

Do you think sailing ships may become popular again? Why? Why not? _____

_____

_____

Why is itless expensive to run a sailing ship than a steam ship? _____

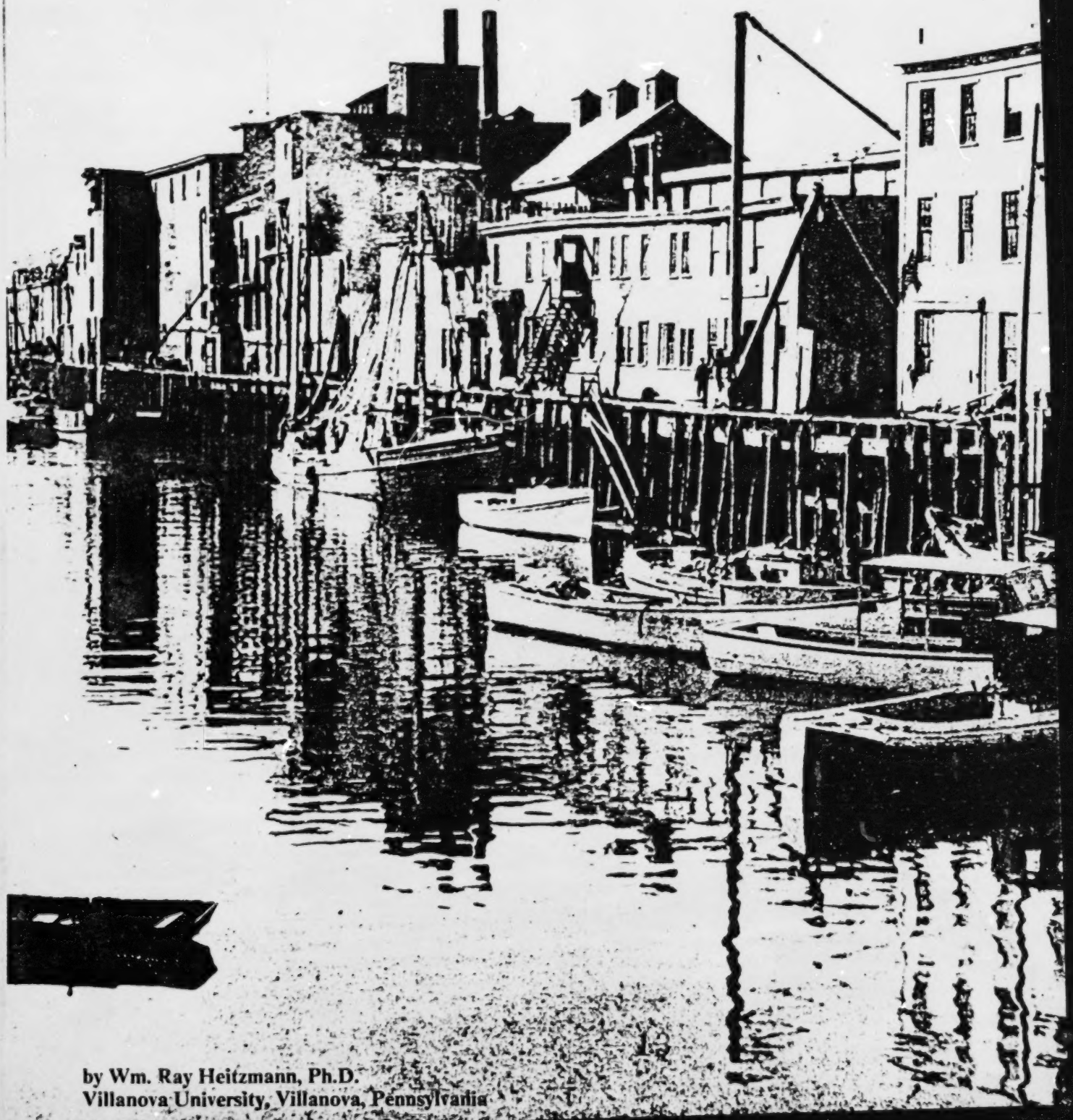
_____

_____

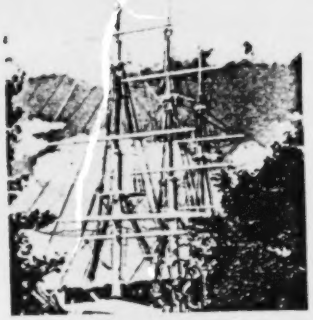
_____

America's Maritime Heritage

A Frequently Forgotten Treasure



by Wm. Ray Heitzmann, Ph.D.
Villanova University, Villanova, Pennsylvania



In the wake of the recent interest in maritime affairs stimulated by the "tall ships" ("Operation Sail"), the Panama Canal controversy, the 200-mile limit discussion, and the growing concern over the fate of the oceans and inland waters, Americans have begun to show a renewed interest in the importance water has played in their nation's development. American music, art, architecture, literature, handicrafts, industry, politics, finance, leisure—all carry the imprint of the sea. Yet this romantic and colorful heritage has escaped the reflection of most Americans. Take a moment to test your own knowledge of the nation's nautical tradition (See Maritime I.Q. Test in the "Get Wet" section).

Photos courtesy of Mystic Seaport, Mystic, Connecticut

Influence of the Sea

A moment's reflection should remind the reader of the role the seas and inland waters have played and continue to play in the lives of peoples and destinies of nations. Life on earth, the water planet, began in the sea. The sea has served as the geographic setting for early societies and existed as a food source as well as a highway for travel, trade, and cultural interchange. Historically, the sea has been closely involved with the rise and fall of cultures and nations. Some have justified their position on the pages of history because of their utilization of the sea (Phoenicians and Vikings). Others have taken dangerous risks in pursuing foreign policies to obtain more favorable strategic holdings on the sea (Russia—"Windows of the West"). Militarily, major naval battles (Battle of the Spanish Armada and Battle of Midway) have significantly contributed to altering history. Water forms an important part of the ritual and tradition of many religions; for example, the Biblical story of Moses and the opening of the Red Sea, and Noah and the Flood form an important part of Judaic-Christian heritage.

As nations investigate and study inner space in their quest for food, natural resources, and energy (ocean windmills, tidal power, and sea weed exist as realistic energy sources), the world's waters will play an even more significant role in the future of the planet.

The American Tradition

Perhaps the maritime enterprise has been so ingrained into the American experience that it is seldom given much thought. For example, nautical expressions lavishly enrich our language; in fact, if the long-awaited visitors from space arrive and analyze our language, they might conclude we are a seafaring people. Consider the following: "fish story," "first rate," "slush fund," "windfall," "blubber," "taut ship," and "salty tale."

Our nation owes its "discovery" and early development to the sea; as early as 1793, the United States found itself listed as the world's second leading commercial trading country in tonnage. One early maritime involvement of Massachusetts is described by Samuel Morison in *The Maritime History of Massachusetts*. "The gravelly, boulder-strewn soil was back-breaking to clear, and afforded small increase to unscientific farmers. No staple of ready sale in England, like Virginia tobacco or Canadian beaver, could be produced or easily obtained. Forest, farms, and sea yielded lumber, beef, and fish. But England was supplied with these from the Baltic, and by her own farmers and fishermen. Unless a new market be found for them, Massachusetts must stew in her own juice. It was found in the West Indies—tropical islands which applied slave labor to exotic staples like sugarcane, but imported every necessity of life. More and more they became dependent on New England for lumber, provisions, and dried fish. More and more the New England ships and merchants who brought these necessities controlled the distribution of West-India products."

It would not be long before the United States, first as supplier of raw materials and then as provider of manufactured goods and agricultural products, would become the premier commercial trading nation. Similarly, the shipbuilding industry, which predated nationhood, experienced early success and growth and, while somewhat shrunken, still remains a vital and important industry.

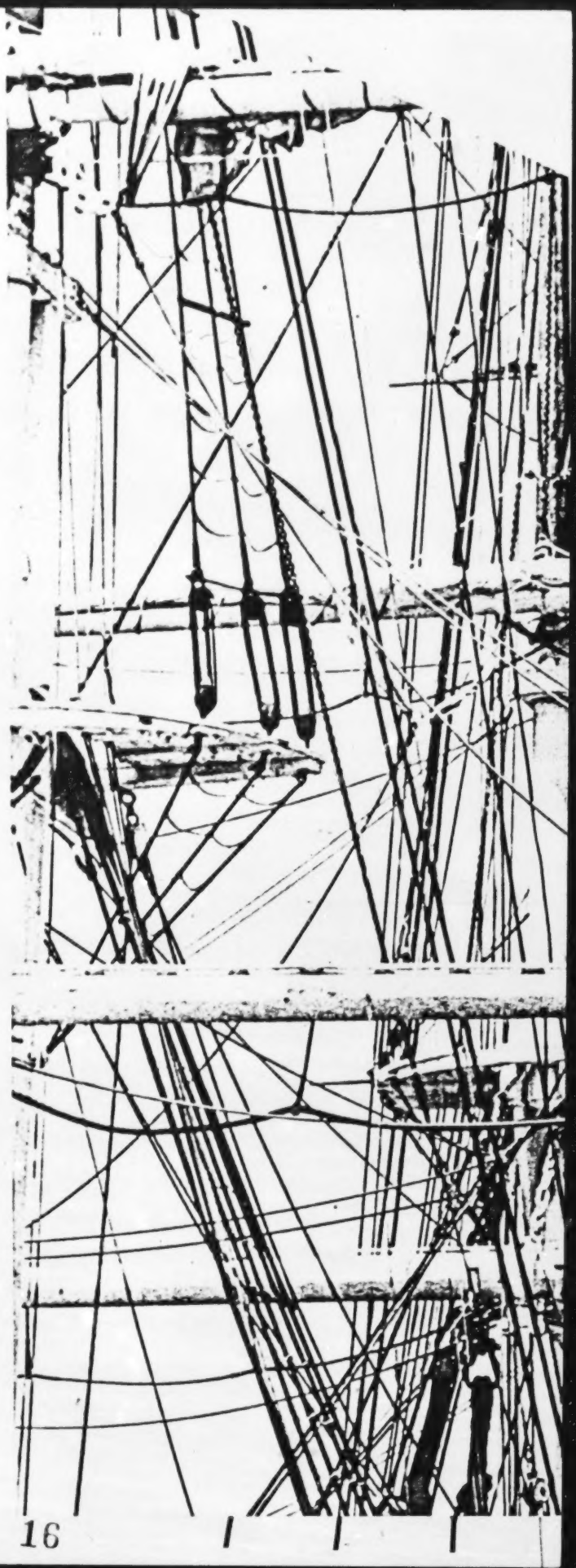
As with shipbuilding and trading, commercial fishing antedates independence and likewise enjoys a rich history. Early coastal enterprises expanded as fisherman milked the bountiful coastal and inland waters of the nation. Gulf of Mexico shrimp boats, Nantucket whalers, and Chesapeake shipjacks all contributed to the industry's color and success. Maritime and naval technology also have a long tradition. Undersea oceanographic research discoveries and the development of the submarine constitute but a small part of this aspect of nautical life.

Historically, we as a nation have been slow to "provide and maintain a Navy;" certainly we presently live in an era of naval doldrums. Despite this, our naval superiority has contributed greatly to the survival of the nation in times of military crises. Additionally, the frequently ignored peacetime activities of the Navy not only sustain the nation's position as a superpower but have contributed to the improvement of the quality of life of the citizenry. Consider the following few examples—fiberglass development, nuclear and laser technology, shark behavior, long-range navigation (Loran/Omega), ship development, weather prediction, undersea habitat research, space exploration, water pollution prevention, evacuation (home and abroad), and disaster relief.

The expansion of leisure time has resulted in a concurrent explosion of interest in water-related recreational activities. Surfing, scuba diving, and riding the white water of river rapids have joined fishing, boating and swimming as popular water sports. Fortunately for those who enjoy these sports, the nation's geography permits and encourages this growth, and these activities will continue to have an effect on the character of our nation.

American arts reflect the nation's experience with the sea; the value of early crafts such as scrimshaw and figurehead carving as objects of art continue to appreciate. Paintings of nautical scenes strike a responsive cord among the populace, and the vast literature of the sea (drama, fiction, biography, poetry) serves to entertain and educate. No discipline escapes the mark of the sea—the lighthouse exists as a unique architectural style, and interest in undersea archaeology is at a high water mark.

It is ironic that a country whose cultural heritage, position as a world power, and standard of living have been so intricately related to the sea, has ignored the contribution of maritime enterprise to the nation's development.



s Maritime Heritage

Stormy Present—Brighter Future

One of the effects of the absence of knowledge about this heritage has been a decline in many aspects of nautical life. One of the first industries of the young nation, ship building, has shown a drastic decline since World War II. The decrease in our fleet from over 6,000 ships in 1945 to just under 500 today gives the impression that the country has not only declined as a maritime power but soon may cease to be one at all. Inability to compete with foreign yards and labor-management difficulties have contributed significantly to this attrition which has hit not only commercial shipbuilding but naval ship building as well. From 1969 to the present, the number of naval vessels has dropped from 976 to less than 500.

Both a cause and effect of this decline is the decrease in foreign trade carried in U.S. flag ships. Presently, the percentage (in tonnage terms) of American foreign trade carried in U.S. ships is below 6 per cent!

The situation in the fishing industry presents almost as dismal a picture. However, the recent controversy over the "200-mile limit" has somewhat enlightened public opinion as to the status of commercial and recreational fishing. Following World War II, many naval craft were converted to fishing vessels, enabling the U.S. to remain second only to Japan in tonnage. Since 1957, though, our position has declined steadily so that we are now in sixth place. Presently, there exists considerable concern, both economic and ecological, about the limits and potential of the undersea crop. This concern has been magnified by the overfishing of certain waters and species by the U.S.S.R. and Japan.

While the situation seems dismal, some trends portend a better day. Much as Sputnik catapulted the United States into a frantic catch-up in space science, the dramatic growth of Soviet seapower launched a new interest in maritime and naval ship expansion. After years of stagnation, the U.S. commercial shipbuilding industry, stimulated by the Merchant Marine Act of 1970, seems to be entering an era of revitalization, and an extensive House of Representatives report has suggested that "the Navy enter the 1980's with an absolute minimum of 600 ships."

Other hopeful signs of a maritime awakening include a growing interest in marine science; the activity of professional organizations and societies on behalf of the industry; the development of maritime and naval parks and museums; the establishment within museums of maritime exhibits—for example, the Smithsonian's Hall of Maritime Enterprise; the inclusion of gift shops of maritime items; the rise in the sales of manufacturers and distributors of nautical wares; and the expansion of TV shows about the sea, its promise and problems.

These trends stimulate moderate optimism; continued progress in information dissemination will result in an expanded appreciation for the nation's rich, colorful, and immensely interesting maritime tradition.

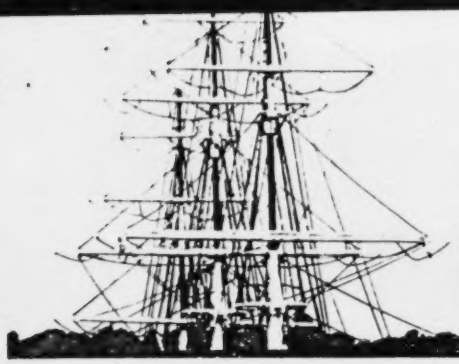
America's Forgotten Maritime Heritage:
Primary Ingredient for Education Programs

by Wm. Ray Heitzmann, Ph.D.
Villanova University, Villanova, Pennsylvania

Test your own maritime heritage I.Q.

1. What percentage of the earth's surface is covered by water? _____
2. What is the number of miles of navigable (depth of 9 feet) waterways in the U.S. (including the Inter-coastal Waterway)? _____
3. Name three expressions that have become part of our language because of the nation's nautical tradition:
   a) _____
   b) _____
   c) _____
4. Name three museums that treat the maritime aspect of the nation's development:
   a) _____
   b) _____
   c) _____
5. What canal (located in the upper Mid-west) by 1930 was handling twice the tonnage of the Panama and Suez combined? _____
6. What is the present number of U.S. Naval vessels? _____
7. What percent of American trade is carried in U.S. flag ships? _____
8. What North American body of water holds the greatest promise of providing energy from tidal power? _____
9. What is the origin of the name of the following towns?
   a) Ship Bottom (N.J.) _____
   b) Nags Head (N.C.) _____
10. What American lakes also boast about a sea monster similar to Loch Ness?
    a) _____
    b) _____
11. Where could one find a map of sunken treasure ships? _____
12. What percent of coastal trade is inland waters trade? _____
13. What is an inexpensive source of prints of ships? _____
14. What percent of the nation's energy is supplied by hydroelectric power? _____
15. Name three peacetime contributions to American society developed by the U.S. Navy _____
    _____
    _____

(Consult page 58 for answers.)



The influence of the world of water has been indelibly imprinted upon the American experience. Art, music, law, literature, finance, and handicrafts all carry the mark of the sea. Unfortunately, this colorful and romantic heritage, encompassing everything from seascapes to surfing to lighthouses, has escaped the attention of most Americans.

This field of knowledge offers the student of marine education numerous opportunities for enjoyable and profitable investigation. Some suggested areas for lessons, mini-units, and units follow:

A. For children in the primary grades, an appreciation of the merchant marine and maritime trade can be gained from the Adopt-A-Ship Plan. Once a class adopts a ship, the students can correspond with the captain and officers. This can be particularly beneficial to teachers in the inland areas of the nation. For particulars write to: Adopt-A-Ship Plan, The Propeller Club of the United States, 1730 M Street, N.W., Suite 413, Washington, D.C. 20036.

B. Two workbooks completed by the author offer the opportunity to increase the awareness of children concerning the maritime sphere and the energy problem. Designed to develop basic skills and to motivate, the books are entitled, *From Sail Power to Nuclear Power: America's Heritage and Energy Education*, Activity Book I and Activity Book II. Interdisciplinary in scope, they contain lessons on topics such as: Energy from the Sea (tidal power, ocean windmills), Lighthouses, Map Skills, Sea Language Crossword Puzzles, Charts of Sources of Oil, Undersea research. The booklets, which easily lend themselves to integration into existing lessons or can be used separately, contain photographs, maps, and illustrations. They may be obtained from Con-Stran Publications, River Park Bldg., Suite 2108, 3600 Conshohocken Ave., Philadelphia, Pennsylvania 19131 at a cost of $3.00.

C. Local and state history can provide content for a maritime unit in communities and regions located on or near bodies of water (which includes most of our nation). Students in inland areas may discover ships named for their localities, or may trace water-transported products to or from their town or city. Frequently, a retired merchant mariner or naval officer may reside in the district and can serve as a resource person and speaker.

D. Fishing, maritime trade, shipbuilding, and water-related sports present the opportunity to investigate enterprises found along coastal areas and in waters. These activities, which predate nationhood, have rich and successful histories and have made important contributions to the nation's development.

E. Often models can serve as springboards to learning experiences. This can be done on an individual or group basis. Down East Crafts (198 Main Street, Yarmouth, Maine 04096) provides inexpensive preassembled kits of lighthouses and wharfs, and Ships-A-Sailing (P.O. Box 4998, Manchester, New Hampshire 03108) has original "Ship in a Bottle" kits (for assembling or completed). These would be particularly good for young or unskilled children. Many hobby stores offer kits (e.g. Revell) for assembling the more sophisticated models. These can also serve as items for display.

F. The abundant architecture, art, literature, and music of the sea taking the form of lighthouses, seascapes, biography, ballads, drama, poetry, songs, and many others offer ample opportunities for the creative educator.

The flexibility and variety of maritime heritage subject matter make it extremely attractive to educators. It serves to motivate and interest persons of all ages. While presently in a period of doldrums, the nation has a rich and colorful nautical tradition. The present is stormy but the future is bright. The "Tall Ships" (Operation Sail) spectacular, the 200-mile limit situation, the Panama Canal controversy, and the growing concern with the fate of the oceans have served to focus the attention of the Americans upon the sea. Other hopeful signs of a maritime awakening include the development of maritime and naval parks and museums; the establishment within museums of maritime exhibits; the inclusion within gift shops of nautical items (paintings, artifacts, handicrafts, objects of art); the rise in the sales of maritime wares; the expansion of television shows about the sea; the continuing interest in the exotic-Bermuda Triangle, Lost Continent of Atlantis, and various other topics; energy and the sea; the search for sunken treasure ships; and the U.S. Navy-Soviet Navy competition and development.

Hopefully, as the nation remembers its maritime heritage, it will have a greater respect and concern for the future of the sea and the inland waters. A bibliography of resources follows:

Periodicals

American Neptune—a research publication of the Salem Peabody Museum. Containing interesting articles of a scholarly nature, this journal provides information on America's maritime history. Peabody Museum, Salem, Massachusetts 01970.

Boating—a popular, nicely illustrated magazine containing historical, contemporary, and how-to articles. Students will find advertisements as well as articles of interest. P.O. Box 2773, Boulder, Colorado 80302.

Cruising—a popular magazine aimed almost totally at readers interested in sailing. Each issue contains articles on technique, possible adventures, tours, and other general sailing-related topics. The illustrations and advertisements will be enjoyed by students. Cruising World Publication, Inc., 524 Thomas Street, Newport, RI 02840.

Oceans—publication of the Oceanic Society, "an education and charitable nonprofit membership organization." This journal, which treats current and historical topics related to maritime affairs in a readable comprehensive fashion, contains excellent and beautifully done photographs, sketches, and illustrations. 240 Fort Mason, San Francisco, CA 94123.

Oceanus—a quarterly investigating and reporting recent findings on the sea. Generally very readable, the topics will interest educators with a concern for the frontier of sea research. Woods Hole Oceanographic Institution, Woods Hole, MA 02543.

Sea Frontiers—a short bi-monthly magazine with articles (illustrated), concerning advances, explorations, and discoveries related to the marine sciences. Published by International Oceano-Graphic Foundation, 10 Pickenbacker Causeway, Virginia Key, Miami, Florida 33149. This organization also publishes *Sea Secrets*.

Sea History—clearly one of the finest periodicals in the field. Each issue contains historical articles as well as current issues of a historical interest (ship restorations). National Maritime Historical Society, 2 Fulton Street, Ferry Landing, Brooklyn, New York 11201.

Sea Power—a publication of the Navy League, "an independent, non-profit, civilian education organization." Recent editions have contained articles (illustrated) on various aspects of maritime life—fishing industry, oceanography, shipbuilding. *Sea Power*, 818-18th Street, N.W., Washington, D.C. 20036.

Shipmate—a U. S. Naval Academy Alumni Association publication which along with articles relative to the Alumni contains well done general features. Alumni Association, Alumni House, Annapolis, Maryland 21402.

Steamboat Bill—a quarterly publication of the Steamship Historical Society of America. This journal contains short, interesting, well-illustrated features on topics such as ferry boats, Mississippi show boats, and other non-naval steamships. Dept. M.S., 101 President Rd., Westwood, New York 07675.

United States Naval Institute Proceedings—publication of the U.S. Naval Institute, "a private, professional society for all who are interested in naval and maritime affairs." Past issues of this journal constitute an excellent primary source of maritime (especially naval) history as the periodical has just celebrated its centennial anniversary. More recent issues deal with current maritime and naval problems. The Institute also publishes books related to naval and maritime affairs. The *Naval Review*, an annual (yearbook), reviews the year's developments and suggests future directions for the Navy, Coast Guard, Marines, and related maritime life (illustrated). U.S. Naval Institute, Annapolis, Maryland 21402.

United States Naval War College Review—a scholarly publication with articles relating not only to the Navy but also to America's maritime industry. Useful for a history of the Navy as well as current thinking on naval problems—strategy, race relations, women in the Navy, etc. Limited distribution, but available at many libraries. U.S. Naval War College, Newport, R.I. 02480.

Warship International—a magazine dealing with naval ships of all types, from various nations and time periods. This periodical is highly illustrated with sketches, pictures, and plans of ships. Appearing quarterly, it is published by the Naval Records Club, 726 North Reynolds Road, Toledo.

Books, Pamphlets, Films, Miscellaneous

Abbott, Sue Sweeney, et al. *Undersea Treasures*. Washington, D.C.: National Geographic Society, 1974. This recent book, containing over 300 pictures, illustrations and maps, provides the reader with an excellent narrative account of the riches to be obtained from the sea. The book is also unique in combining history and oceanography.

Albion, R. G. *Naval and Maritime History: An Annotated Bibliography*. (4th Edition). Mystic, Connecticut: The Marine Historical Association, 1972. An outstanding reference work listing books in all areas of maritime history (navies, safety at sea, original seafaring accounts, whaling, sea routes). This work contains 5,000 entries and is a must for any library.

Albion, R. G., W. A. Baker and Benjamin Labaree, *New England and the Sea*. Middletown, Connecticut: Wesleyan University Press, 1972. Essentially a history of the region and its relationship with the sea. Listed here because of its appeal to all readers. Contains many photographs that enrich the romantic maritime history of the area.

Alone in My Lobster Boat. Xerox Films, 245 Long Hill Road, Middletown, Connecticut. A twelve-year old boy is permitted to be his own man for one day. In this sixteen minute color film, a young boy is taught the responsibilities, the difficulties, and the costs of a Maine lobster fisherman, his father's profession.

Americana: Yankee Whaling. Audio-Visual Center, Indiana University, Bloomington, Indiana. A twenty-seven minute black and white film that takes the viewer on a tour of one of the last remaining 19th Century whaling ships at Mystic, Connecticut. The film (1968) contains actual scenes of harpooning, cutting, and burning of blubber.

Barlow, A. M. *Ferryboat*. New York: Dramatist Play Service, 1974. This play details the chance meeting of two young people on a ferryboat. (One man, one woman, one exterior.)

Bibliography on the History of Water Transportation. Washington, D.C.: Smithsonian Institute, 1965. This bibliography, although dated, exists as a fine compilation of books on ships, mariners, inventors, discoverers, ports, and maritime lore.

Big Load Afloat. American Waterways Operators, Inc., 1965. An excellent small book valuable to the reader because of its emphasis on the inland waters. Contains several maps on the nation's major waterways.

Bradford, Gershom. *The Mariner's Dictionary*. New York: Weathervane Books, 1952. Containing many illustrations and non-technical explanations of the terms. This reference work should become part of the library of those with an interest in the sea.

Bryant, Samuel W. *The Sea and the States: A Maritime History of the American People*. Gloucester, Massachusetts: Peter Smith, Publisher, Inc. 1974. The historical account of the development of the Navy and Merchant Marine in the United States.

Down East Crafts. A company that provides prepared "Do It Yourself Kits"; some need only to be put together, others need minor sanding and painting. These relatively inexpensive kits (lighthouses, shrimpboat, schooner, and others) serve as excellent hands-on springboards into other activities or as the focus of a bulletin board display. 198 Main Street, Yarmouth, Maine 04096.

Erie Canal. BFA Educational Media, 2211 Michigan Avenue, Santa Monica, Ca. The history of the canal is traced through the use of old photographs and drawings in this seventeen-minute color film; the film emphasizes the contribution of the canal to the growth of America.

Exploring America 1977. New York: CBS Radio Network. A series of short broadcasts that appeared on Saturday, April 16, and Sunday, April 17, 1977. With Charles Kuralt narrating, the programs detail all aspects of the world of water. A transcript is available.

Goldin, Augusta. *The Sunlit Sea*. Toronto: Fitzhenry and Whiteside, 1968. A wonderful book for young children; it will intrigue them because of the content and illustrations (by Paul Galdone).

Great Lakes Ports of North America. Ann Arbor, Michigan: The Lesstrang Publishing Corporation. A well illustrated book on the 22 deep-water ports that lie within the Great Lakes and the St. Lawrence Seaway. The aerial photographs and the information on the ports make this a useful book.

Groenen, L. *Illustrated Marine Encyclopedia*. Toronto: George J. McLeod, Ltd., 1948. Although a good reference work, it is somewhat dated.

Harbor Pilot. BFA Educational Media. The experience and knowledge of the harbor pilot are portrayed in this ten-minute color film, which shows how the skills of the pilot enable him to safely guide ships into port.

Hass, Hans. *Men Beneath the Sea*. New York: St. Martins, 1975. A readable, illustrated book by a well-known diver and writer. Contains many first-hand accounts.

Heitzmann, W. Ray. "America's Maritime Heritage: A Bicentennial Treasure." *Social Education*, October, 1975. The author offers teaching suggestions as well as a bibliography of materials and museums for instruction. It can be shared with teachers contemplating units and lessons on maritime studies.

———. *From Sail Power to Nuclear Power: America's Maritime Heritage and Energy Education*—Activity Book I, Activity Book II, Short, well-illustrated publications designed for students, grades 5 to 12. These booklets offer high interest motivational topics with many illustrations. Con-Stran Publications, River Park Building, Suite 2108, 3600 Conshohocken Avenue, Philadelphia, Pennsylvania 19131.

Heritage and Horizons. Washington, D.C. Department of the Navy. A film produced recently for the bicentennial lists recent naval activities with excellent historical footage of war and peace-time events.

Canals: Towpaths West. Pennsylvania State University AV Services, Willard Bldg. University Park, Pa. A seventeen-minute film detailing the purpose and technical aspects of the early canals.

Captain Stormalong. BFA Educational Media, 2211 Michigan Avenue, Santa Monica, California. This thirteen-minute color film details the adventures of one of America's favorite sea captains in the days of wooden ships. The film covers Stormy's life from a cabin boy on a schooner until he becomes captain of the *Courser*, the largest of the clipperships.

Catalog of United States Coast Guard Films (Annual). Washington, D.C.: U.S. Coast Guard. An annotated bibliography of 33 films available from the U.S. Guard. The Navy's Recruiting Command also provides films.

Chapelle, H. I. *History of Sailing Ships*. New York: Norton, 1935. This work by a naval architect deals primarily with ship design. This outstanding work contains chapters on topics such as revenue cutters, sailing yachts, and naval craft.

Chatterton, E. K. *Old Sea Paintings: The Story of Maritime Art as Depicted by the Great Masters*. 1928. New York: Dodd. This work contains many excellent paintings.

Church, W. C. *Life of John Ericson*, (2 volumes). New York: Holt. The biography of the famous architect and engineer best known for building the *Monitor*. A more recent biography is R. M. White's *Yankee from Sweden*, 1960. New York: Holt, Rinehart and Winston, Inc.

Clark, J. "Sun Ship Also Rises," *Philadelphia Magazine*. (Reprints available from Sun Shipbuilding Company, Chester, Pennsylvania.) A well done article on the Sun Shipbuilding Company. The article summarizes the decline of the shipbuilding industry as well as the history of Sun Company. Also available, "How Ships Are Built."

Coast Guard History. Washington, D.C.: U.S. Coast Guard Public Information Division (CG-213). A short booklet summarizing the history of the Coast Guard from its days as the revenue marine and the revenue cutter service. The booklet contains many historic and contemporary illustrations.

Cooper, Elizabeth K. *Science on the Shores and Banks*. New York: Harcourt, Brace and World, 1960. A good first book for early adolescents that introduces the reader to many aspects of sea life.

Cutler, C. C. *Greyhounds of the Sea: The Story of the American Clipper Ship*. New York: Putnam, 1930. Information on the ships of one of the most romantic periods of maritime history. Data on owners, speed, and construction.

Dana, R. H. *Two Years Before the Mast*. (1840) New York: Signet Classics, 1964. One of the great classics of maritime life aboard ship. Dana interrupted his studies at Harvard to ship aboard a Boston brig to California. His commentary of life aboard ship made it a classic.

Historically Famous Lighthouses. Washington, D.C.: U.S. Coast Guard Public Information Division (CG-232). An 88-page booklet containing information on lighthouses located in the coastal and Great Lakes states as well as Hawaii. The booklet contains a picture and short history of each of the lighthouses. As lighthouses form a romantic and interesting part of our nation's maritime heritage, this booklet provides a useful and enjoyable account of part of that heritage. The Coast Guard offers several booklets.

Hooper, E., Allard, Dean C. and Oscar Fitzgerald. *The United States Navy and the Vietnam Conflict*. Washington, D.C.: Naval History Division, Department of the Navy, 1976. This organization produces many well-written books on naval history that can serve as fine references.

Huntress, Keith. *Narratives of Shipwrecks and Disasters*. Ames, Iowa: Iowa State University Press, 1974. This work covers the 275 years (1586-1860) when wooden sailing ships were in their Golden Age. Specifically, the author relates the story of the destruction of 24 ships.

Inches, H. D. *The Great Lakes Wooden Shipbuilding Era*. Vermilion, Ohio: Great Lakes Historical Society, 1962. An account particularly useful to teachers of the upper Middle West wishing to integrate some local maritime history into their courses.

Inland Waterways-Inland Ports. Arthur Barr Productions, P.O. Box 7-C, Pasadena, California. This fifteen minute film depicts the importance of water transportation. The film shows a large sea going freighter's journey to an inland port to deposit its cargo. The port activities (exchange of goods—barges, trains, trucks, ships) are shown.

Jobe, J. *The Great Age of Sail*. New York: Time-Life. 1967. A nicely illustrated and well-written popular account of the days when sail was king on the seas.

Johnson, David. *Clipper Ships and the Cutty Sark*. New York: Grossman Publishers. This collection of primary sources, sketches, and narrative accounts of the clipper ships is part of the Jackdaw Series. It is useful in discovery-inquiry lessons or for just posting on bulletin boards.

Kaufman, Betsy B. "The Planning of the Multimedia Study: Man's Interest and Fascination with the Sea," *Journal of English Teaching Effectiveness*, 1973. This article is useful to the teacher wishing to approach maritime studies in an interdisciplinary manner. The author lists several valuable books (fiction and non-fiction) for use with students.

Kemp, Peter. *The Oxford Companion to Ships and the Sea*. London: Oxford University Press, 1976. One of the most comprehensive, well done reference works available; really a must.

Kennedy, Ludovic. *Pursuit*. New York: Pinnacle Books, 1975. A scholarly and very readable account of the chase and sinking of the *Bismark*. This analysis benefits from material only recently made available (1973) and conveys the drama of the chase.

Kimmel, H. E. *Admiral Kimmel's Story*. Toronto: S. S. Reginald Sanders & Co., Ltd., 1954. Kimmel, naval commander at Pearl Harbor, defends his actions prior to the attack by the Japanese.

Knight, F. *The Sea Story, Being A Guide to Nautical Reading from Ancient Times to the Close of the Sailing Ship Era*. London: Macmillan, 1958. A valuable guide to fiction. The author, a retired British ship captain, suggests reading in various categories.

Laing, Alexander. *American Heritage History of Seafaring America*. New York: American Heritage Press, 1974. An outstanding chronicle of our nation's seafaring heritage containing 329 illustrations. This book exists not only as a valuable reference work but as a source of maritime art, paintings, engravings, scrimshaw, and prints.

Lewis, C. L. *Books of the Sea, An Introduc-*

tion to Nautical Literature. Annapolis Maryland: U.S. Naval Institute, 1943. Includes both critical reviews and listings of works—novels, short stories, poetry, plays. Examples of chapters: Naval History, Ships and Merchant Marine, Biographies (of seaman, pirates, mutineers, and slavers).

Life in an Eastern Seaport Town 1870. ACI Media, 35 West 45th Street, New York, N.Y. 10017. Although somewhat narrative, this film contains an abundance of information on life in a whaling town; filmed in Mystic, Nantucket, and New York, the photography enhances the production.

Life on the Sea Shore. England: B.P.C. 1969. A short reference book for youngsters that provides definitions as well as illustrations of each topic.

Lloyd, C. *Ships and Seaman: From The Vikings to the Present Day. A History in Text and Pictures*. Cleveland: World Publishing, 1961. The author has culled a fine collection of pictures to complement his text.

Lord, W. *A Night to Remember*. New York: Holt, 1955. This book describes the sinking of the great White Star liner, Titanic, on April 15, 1922 with the loss of 1,198 lives.

Lott, A. and E. Engle. *America's Maritime Heritage*. Annapolis, Maryland: U.S. Naval Institute, 1975. A high school textbook, the first of its kind, directed at students in the NJROTC Program. Lavishly illustrated, it provides a host of information both for the teacher and student.

MacDonald, R. N. *Using Tools-Whaling*. Cambridge, Massachusetts: Educational Development Center, Inc., 1974. A unit in the curriculum project, "People and Technology," focusing on a case study investigation of a highly developed craft technology. The experimental unit contains many types of good instructional materials and media (a film, film-strips, a simulation game, artifacts, primary sources, a poster, a model ship construction kit). The unit contains the ingredients for interesting, interdisciplinary student-oriented lessons based upon whaling life in early Nantucket. Many of the materials can be displayed.

Marx, Robert. *Shipwrecks of the Western Hemisphere*. A delightful introduction to underwater archeology, treasure hunting, and skin diving in the sea.

McClung, Robert. *Treasures in the Sea*. Washington, D.C.: National Geographic Society, 1972. An excellent book for the younger child containing many fine photographs and graphics and a minimum of printed information.

McCosker, M. S. *The Historical Collection of Insurance Company of North America*. Philadelphia: Insurance Company of North America, 1967. This book contains an annotated list of marine paintings, prints, books, records, ship models, and other memorabilia contained in the company's collection, which is located in libraries around the country. In addition, the book contains many beautiful illustrations of the above.

McFee, William. *The Law of the Sea*. Philadelphia: Lippincott, 1950. The author has written a summary of the historical development of maritime law.

Merrill, J. *Quarterdeck and Fo'c'sle: The Exciting Story of the Navy*. Chicago: Rand McNally, 1963. A collection of primary sources (reports, logs, letters) from the Revolution to the present. Excellent for use by students in present or abbreviated form.

Port of Duluth-Superior. Duluth, Minn.: Seaway Port Authority. This is a short illustrated booklet dealing with the ports of Duluth and Superior. Duluth as the nation's number one port (in tonnage) deserves the attention of the student of American studies and maritime affairs. All major ports and most minor ports have such publications available free.

Potter, E. B., and C. W. Nimitz. *Sea Power: A Naval History*. Englewood Cliffs, New Jersey: Prentice-Hall, 1960. This volume, the text used at Annapolis and most of the NROTC programs, provides a comprehensive history.

Propeller Club of the United States, 1730 M Street, N.W., Suite 413, Washington, D.C. 20036. This organization promotes many maritime activities—American Merchant Marine Conference, "Adopt-A-Ship" Plan for school children, and the "National Maritime Essay Contest" for high schoolers.

Revell, Inc., Venice, California 90291. Several challenging models (*Mayflower, Cutty Sark, Eagle*, others) will provide both the job of construction and display.

Seamanship. New York: Time-Life Books, 1972. One of the outstanding Time-Life Library of Boating Series. This as the others are renown for their detail and illustrations.

Seaword. Maritime Administration, U.S. Department of Commerce, 14th and E Streets, N.W. Washington, D.C. 20230. A newsletter providing recent developments in the maritime industry.

Selected Oceanographic Publications. Washington, D.C.: U.S. Government Printing Office. A short annotated bibliography of publications available from the U.S. Government Printing Office. These publications are generally short essays and booklets.

Ships A Sailin'. P.O. Box 4998, Manchester, N.H. 03108. This company provides models in kits or completed form, ships in the bottle using the original method used by early American mariners. These can serve as excellent items for display.

Ships Through the Ages. Coastal/Oceanic Awareness Studies. School of Education, University of Delaware. This mini-unit explores the history of maritime exploration from log boats to the clipper ships. While most items in this series are marine science oriented, several do treat the humanities.

Snow, E. R. *Incredible Mysteries and Legend of the Sea*. New York: Dodd Mead and Company, 1966. Snow, the author of many books about the sea, provides the reader with several extremely interesting stories. His books will be found attractive to readers of all ages particularly because of the nation's curiosity concerning the exotic.

Songs and Sounds of the Sea. Washington, D.C.: National Geographic Society, 1973. (Stereo-recorded). A collection of American folk songs related to the sea. These songs, mingled with the sounds of the sea, were sung by the hardy men who form America's maritime tradition.

Spectorsky, A. C. (Ed.) *The Book of the Sea*. New York: Appleton, 1954. This is an anthology containing 83 well-chosen selections. This massive work of 488 pages contains many excellent illustrations.

Stackpole, E. A. *The Sea Hunters*. Toronto: Lippincott, 1953. Stackpole's account of early American whaling is the most authoritative publication on the topic.

Meyers, Judith. *Waldo the Whale*. Mystic, Connecticut: Education Department, Marine Historical Association. A short booklet designed for upper elementary school students dealing with sharing in an educational and humanistic fashion. The educational department of the Marine Historical Association is one of the few organizations producing educational materials.

Miller, Nathan. *U.S. Navy: An Illustrated History*. Annapolis, Md.: U.S. Naval Institute Press and New York: American Heritage Publishing Co., 1977. Lavishly illustrated, this will easily become the most popular work of its type on our nation's navy.

Mississippi River Navigation. Vicksburg, Mississippi: Mississippi River Commission, 1971. A booklet containing a significant amount of information on the river. In addition to a history of the river, maps, charts, and pictures are included.

Menard, H. William and Jane L. Scheiber (eds.). *Oceans*. Del Mar, California: Publishers, Inc., 1976. A book of readings that contain an excellent selection of articles on every aspect of the maritime sphere.

"Naval and Maritime Prize Photography" Contest Winners. U.S. Naval Institute, Annapolis, Maryland 21402. A reprint booklet of photographs that have won the yearly contest sponsored by the U.S. Naval Institute. Photographs (color and black and white) are of framing quality. The Institute, with a collection of several hundred thousand pictures, also is a prime source of photographs of ships.

Navy, Marine Corps, and Coast Guard. Washington, D.C.: Government Printing Office. A listing (some annotated) of government publications concerning the Navy, Marines, and Coast Guard. These publications include topics such as safety, military law, astronomy, radar, and oceanography.

Ocean Freighters. Philadelphia: Curriculum Materials Corporation. Extremely valuable filmstrip for young children; it dis-

cusses topics such as tugboats, wharfs, anchors, lighthouses. This organization offers several, good but dated, maritime filmstrips.

"*Old Navy I, II Portfolio.*" Washington, D.C.: The National Archives. These are outstanding prints from the Franklin D. Roosevelt collection reproduced in color on quality paper at a reasonable cost that can be used for displays and bulletin boards.

O'Neill, Eugene. *The Complete Works of Eugene O'Neill*. New York: Random House, 1941. This collection contains many plays with a maritime setting (aboard a barge, a transatlantic liner, and merchant ship) and with maritime themes (death at sea, loneliness, frontier). O'Neill, one of America's great playwrights, chose the sea as the setting for many of his plays.

Operation Rescue—Cleaning and Care of Oiled Waterfowl. Washington, D.C.: American Petroleum Institute. A booklet provoked by the criticism of oil spills and their effects tells of the development of techniques to treat birds that have come in contact with oil. The publication is not only interesting for its treatment of this topic but for its discussion of water pollution (by oil) in general.

Ortzen, Len. *Strange Mysteries of the Sea*. London: Arthur Barker Limited, 1976. Well-written stories that will hold the reader's interest and provide an insight into the lore of the sea.

Steamboat Bill. BFA Educational Media. The film relates the tale of the famous riverboat captain, beginning with Bill's days in Council Bluff, Iowa, when he was determined to become "the most famous riverboat captain." This 11-minute color film portrays the lure of the rivers.

"Treasure Maps and Charts." *Social Education*, Vol. 35, No. 1, December, 1971. An annotated bibliography of treasure maps and charts listing locations of sunken ships. The bibliography lists addresses for obtaining the maps.

Villiers, Captain A. *Men, Ships and the Sea*. Washington, D.C.: National Geographic Society, 1972 (new edition). This is clearly one of the outstanding pictorial and narrative accounts of the historical development of ships. It contains chapters such as "Medieval Marines Enrich Coasts with Commerce," "Yankee Merchants Tap China Trade," "Steamboats a-Comin'," "Dreadnoughts and Blue Ribbon Liners," and "Small Boating: Everybody's Sport."

United States Merchant Marine—A Brief History. Washington, D.C.: U.S. Department of Commerce Maritime Administration, 1972. A short (seven pages) booklet explaining the history of the Merchant Marine, describing its role and importance in the country's development. A well-written concise essay with illustrations.

United States Naval History: A Bibliography. Washington, D.C.: Naval History Division, Department of the Navy, 1972. This is an extensive bibliography of writings (reports, books, pamphlets, articles) on the Navy and all its activities (armament, strategy, tactics, history, periodicals, research aids).

"United States Navy Lithographs." Washington, D.C.: Government Printing Office. These six sets deal with notable highlights and battles, the evolution of officers' and enlisted men's uniforms, and recruiting posters. Relatively inexpensive, they are suitable for bulletin board use or framing.

Whitney, Didley and Nancy Wood. *The Lighthouse*. New York: New York Graphic Society, 1975. Using almost 300 photographs (over 100 in color), the author has captured the beauty and history of this unique style of architecture.

Wilmerding, John. *History of Marine Painting*. Salem, Massachusetts, Peabody Museum, 1968. An excellent reference—really a classic.

Naval and Maritime Museums

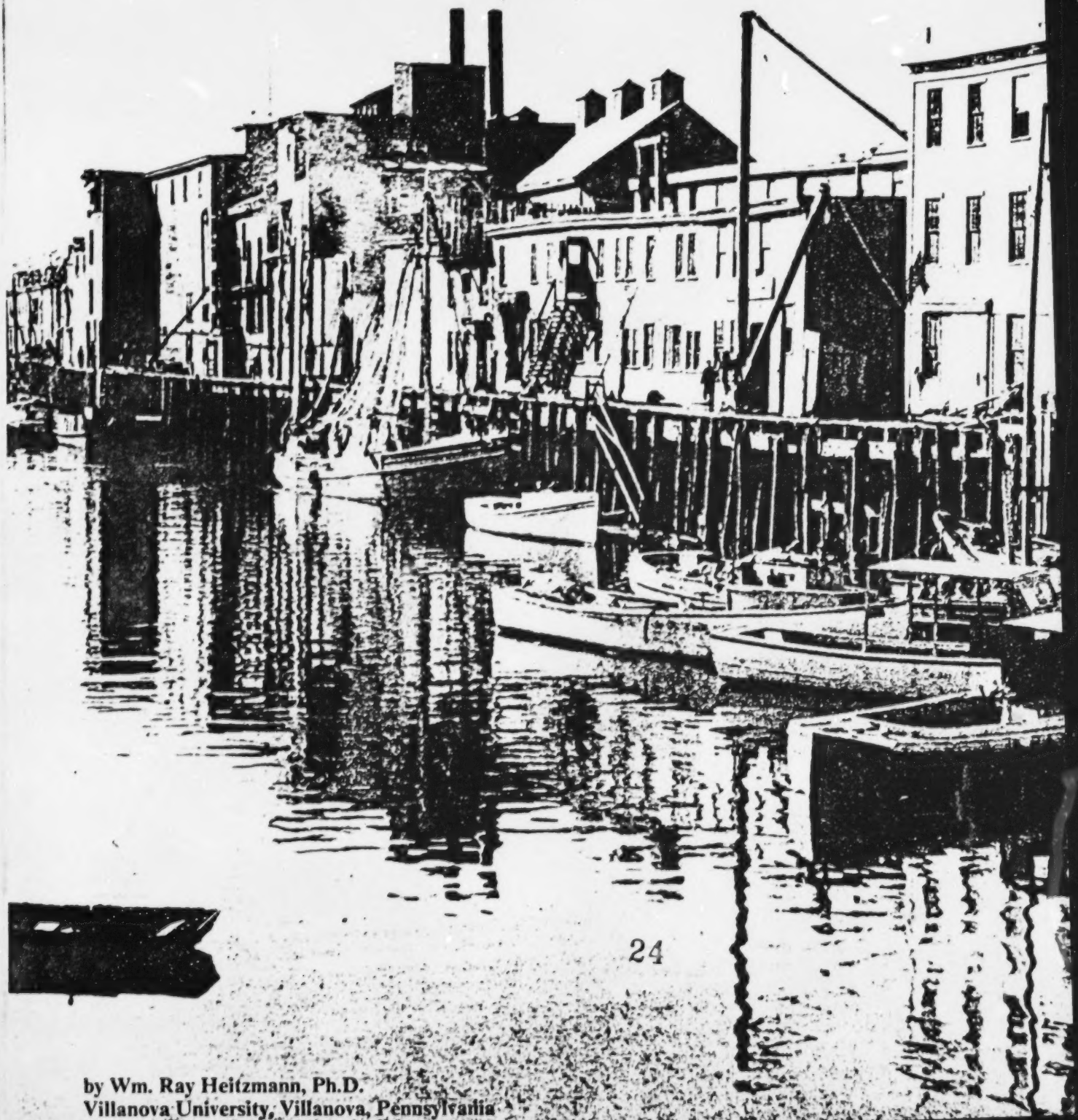
I have prepared a list of museums that can provide valuable field trip learning experiences for teachers and students. If you are interested in obtaining a copy, please write me at Villanova University, Villanova, PA 19085. The abridged list has evolved from the *U.S. Naval Institute Proceedings* (October, 1966), *Marine Museums in the United States*, and personal observations.

Answers to Quiz:

1. Approximately seventy (70) percent of the planet's surface is covered by water; we are indeed a water planet.
2. Approximately 25,000 miles—surely a significant number.
3. a) "Blubber"—adopted from the early whaling industry.
   b) "Windfall"—originally used to describe certain trees felled by storms during the colonial era. There were certain trees marked only to be used by the English Navy as masts; the colonists were prohibited from touching the trees unless nature uprooted them. Consequently, good fortune became known as a windfall.
   c) "An *ironclad* alibi"—taken from the Civil War monitors meaning impervious; thus an alibi that can't be broken.
4. a) San Francisco Maritime Museum.
   b) Philadelphia Maritime Museum.
   c) Patriot's Point Naval and Maritime Museum (Charleston, S.C.).
5. The "Soo" Canal (Sault St. Marie Canal).
6. Approximately 475 (and slowly increasing).
7. Approximately 5 per cent.
8. Bay of Fundy (far northeast United States).
9. a) During the sinking of a ship off the coast of Long Beach Island (20 miles north of Atlantic City, N.J.), a baby was placed in the bow of the ship. When the broken and damaged ship beached, cries of a baby were heard. The child was removed and the town was named after the incident.
   b) A favorite hobby of certain coastal residents was to tie a lantern to the neck of a horse (preferably a lame one) and walk the animal along the beach. This strategy was designed to make ships at sea believe it was safe to move closer to shore (incorrectly believing it was a ship they had seen between themselves and land). Often this resulted in a beached ship whose cargo fell prey to the inhabitants; in some locations, this became a virtual occupation. Thus the North Carolina town received its name.
10. a) Lake Champlain (Vermont).
    b) Payette (Idaho).
11. The Library of Congress publishes such a list; a specific source is F.L. Coffman Machinkaw City, Michigan, owner of maps developed by Caribbean Instruments Co., 5106 N. Poinsetta Avenue, West Palm Beach, Florida.
12. Approximately sixty per cent.
13. "Old Navy I, Portfolio"—The National Archives.
14. Approximately 2 per cent.
15. Weather forecasting, fiberglass development, undersea habitat research.

America's Maritime Heritage

A Frequently Forgotten Treasure



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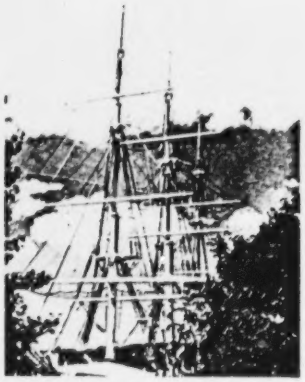
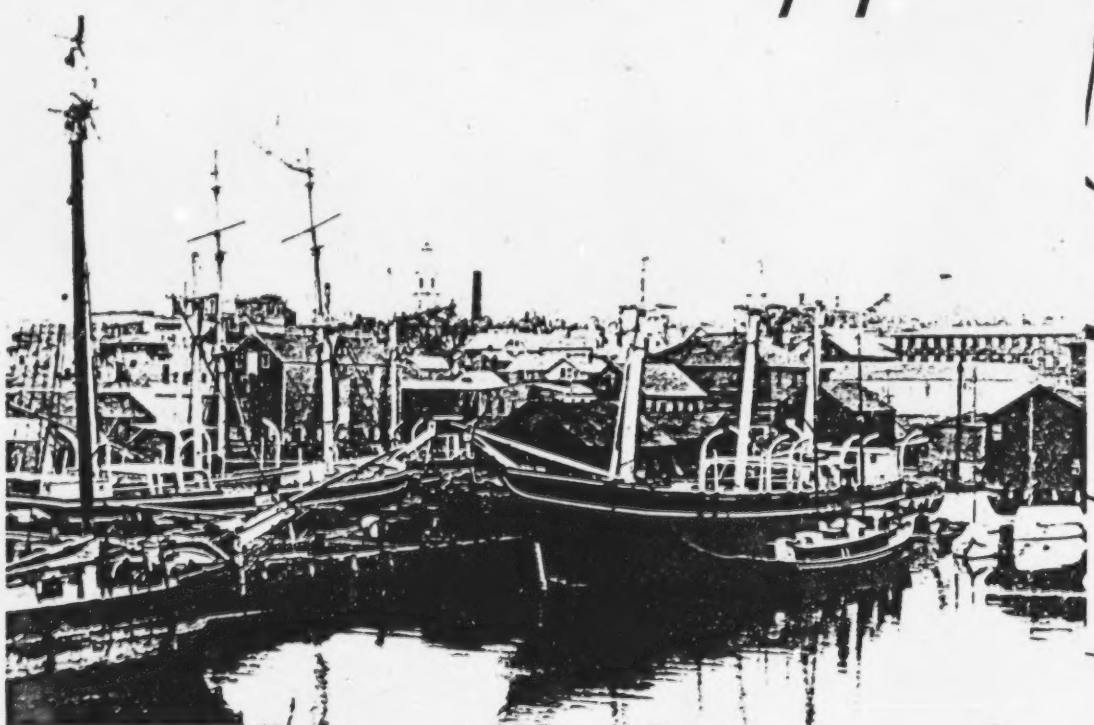
by Wm. Ray Heitzmann, Ph.D.
Villanova University, Villanova, Pennsylvania



In the wake of the recent interest in maritime affairs stimulated by the "tall ships" ("Operation Sail"), the Panama Canal controversy, the 200-mile limit discussion, and the growing concern over the fate of the oceans and inland waters, Americans have begun to show a renewed interest in the importance water has played in their nation's development. American music, art, architecture, literature, handicrafts, industry, politics, finance, leisure—all carry the imprint of the sea. Yet this romantic and colorful heritage has escaped the reflection of most Americans. Take a moment to test your own knowledge of the nation's nautical tradition (See Maritime I.Q. Test in the "Get Wet" section).

Photos courtesy of Mystic Seaport, Mystic, Connecticut



Influence of the Sea

A moment's reflection should remind the reader of the role the seas and inland waters have played and continue to play in the lives of peoples and destinies of nations. Life on earth, the water planet, began in the sea. The sea has served as the geographic setting for early societies and existed as a food source as well as a highway for travel, trade, and cultural interchange. Historically, the sea has been closely involved with the rise and fall of cultures and nations. Some have justified their position on the pages of history because of their utilization of the sea (Phoenicians and Vikings). Others have taken dangerous risks in pursuing foreign policies to obtain more favorable strategic holdings on the sea (Russia—"Windows of the West"). Militarily, major naval battles (Battle of the Spanish Armada and Battle of Midway) have significantly contributed to altering history. Water forms an important part of the ritual and tradition of many religions; for example, the Biblical story of Moses and the opening of the Red Sea, and Noah and the Flood form an important part of Judaic-Christian heritage.

As nations investigate and study inner space in their quest for food, natural resources, and energy (ocean windmills, tidal power, and sea weed exist as realistic energy sources), the world's waters will play an even more significant role in the future of the planet.

The American Tradition

Perhaps the maritime enterprise has been so ingrained into the American experience that it is seldom given much thought. For example, nautical expressions lavishly enrich our language; in fact, if the long-awaited visitors from space arrive and analyze our language, they might conclude we are a seafaring people. Consider the following: "fish story," "first rate," "slush fund," "windfall," "blubber," "taut ship," and "salty tale."

Our nation owes its "discovery" and early development to the sea; as early as 1793, the United States found itself listed as the world's second leading commercial trading country in tonnage. One early maritime involvement of Massachusetts is described by Samuel Morison in *The Maritime History of Massachusetts*. "The gravelly, boulder-strewn soil was back-breaking to clear, and afforded small increase to unscientific farmers. No staple of ready sale in England, like Virginia tobacco or Canadian beaver, could be produced or easily obtained. Forest, farms, and sea yielded lumber, beef, and fish. But England was supplied with these from the Baltic, and by her own farmers and fishermen. Unless a new market be found for them, Massachusetts must stew in her own juice. It was found in the West Indies—tropical islands which applied slave labor to exotic staples like sugarcane, but imported every necessity of life. More and more they became dependent on New England for lumber, provisions, and dried fish. More and more the New England ships and merchants who brought these necessities controlled the distribution of West-India products."

It would not be long before the United States, first as supplier of raw materials and then as provider of manufactured goods and agricultural products, would become the premier commercial trading nation. Similarly, the shipbuilding industry, which predated nationhood, experienced early success and growth and, while somewhat shrunken, still remains a vital and important industry.

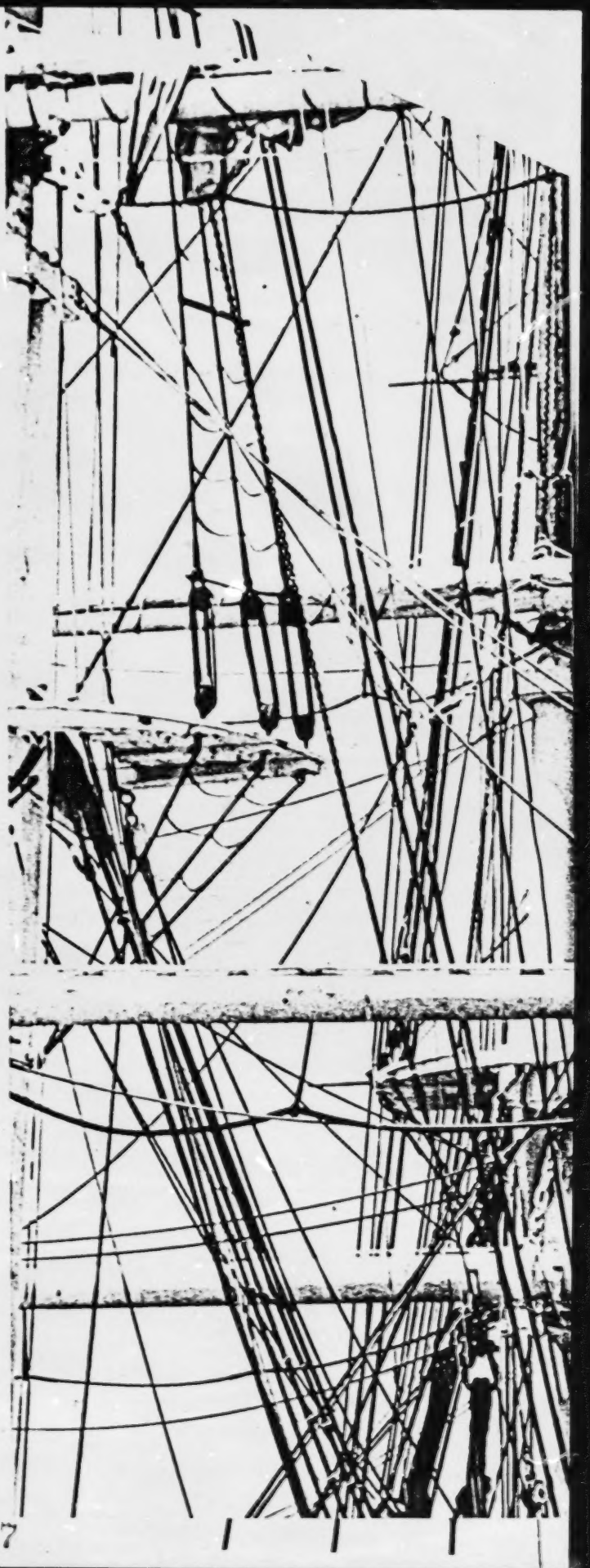
As with shipbuilding and trading, commercial fishing antedates independence and likewise enjoys a rich history. Early coastal enterprises expanded as fisherman milked the bountiful coastal and inland waters of the nation. Gulf of Mexico shrimp boats, Nantucket whalers, and Chesapeake shipjacks all contributed to the industry's color and success. Maritime and naval technology also have a long tradition. Undersea oceanographic research discoveries and the development of the submarine constitute but a small part of this aspect of nautical life.

Historically, we as a nation have been slow to "provide and maintain a Navy;" certainly we presently live in an era of naval doldrums. Despite this, our naval superiority has contributed greatly to the survival of the nation in times of military crises. Additionally, the frequently ignored peacetime activities of the Navy not only sustain the nation's position as a superpower but have contributed to the improvement of the quality of life of the citizenry. Consider the following few examples—fiberglass development, nuclear and laser technology, shark behavior, long-range navigation (Loran/Omega), ship development, weather prediction, undersea habitat research, space exploration, water pollution prevention, evacuation (home and abroad), and disaster relief.

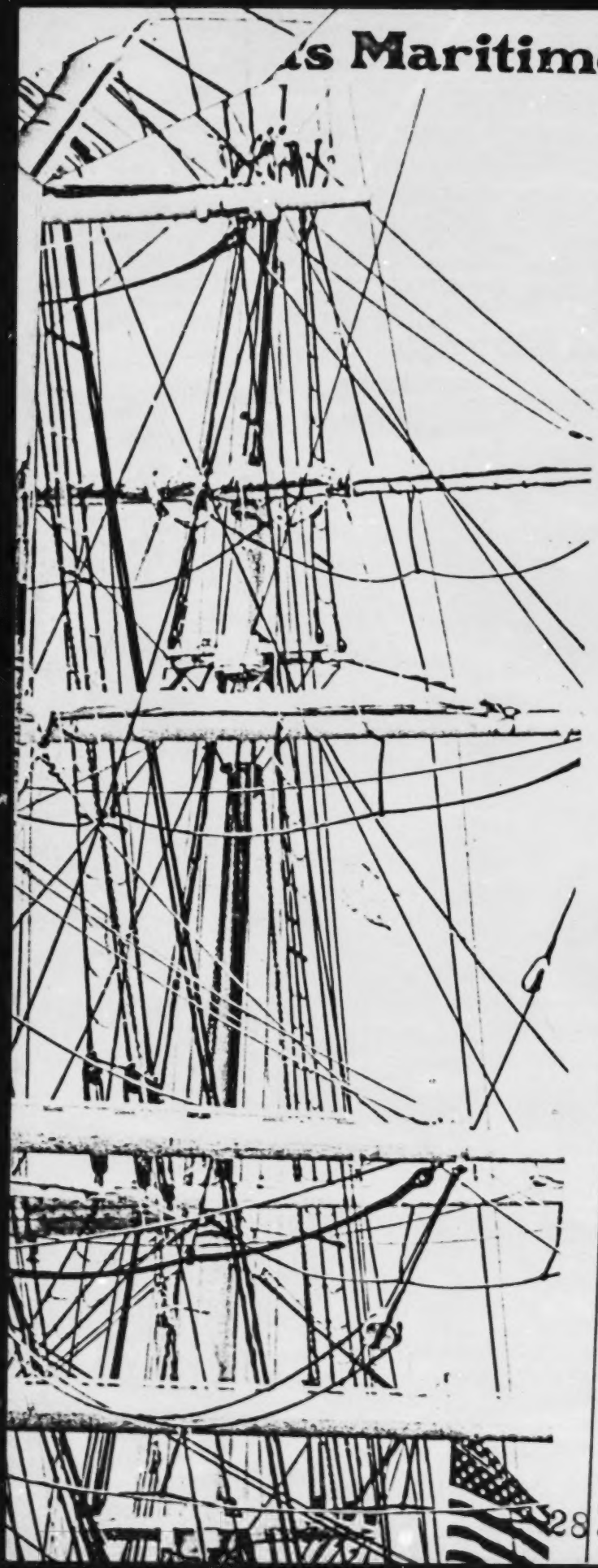
The expansion of leisure time has resulted in a concurrent explosion of interest in water-related recreational activities. Surfing, scuba diving, and riding the white water of river rapids have joined fishing, boating and swimming as popular water sports. Fortunately for those who enjoy these sports, the nation's geography permits and encourages this growth, and these activities will continue to have an effect on the character of our nation.

American arts reflect the nation's experience with the sea; the value of early crafts such as scrimshaw and figurehead carving as objects of art continue to appreciate. Paintings of nautical scenes strike a responsive cord among the populace, and the vast literature of the sea (drama, fiction, biography, poetry) serves to entertain and educate. No discipline escapes the mark of the sea—the lighthouse exists as a unique architectural style, and interest in undersea archaeology is at a high water mark.

It is ironic that a country whose cultural heritage, position as a world power, and standard of living have been so intricately related to the sea, has ignored the contribution of maritime enterprise to the nation's development.



...s Maritime Heritage



Stormy Present—Brighter Future

One of the effects of the absence of knowledge about this heritage has been a decline in many aspects of nautical life. One of the first industries of the young nation, ship building, has shown a drastic decline since World War II. The decrease in our fleet from over 6,000 ships in 1945 to just under 500 today gives the impression that the country has not only declined as a maritime power but soon may cease to be one at all. Inability to compete with foreign yards and labor-management difficulties have contributed significantly to this attrition which has hit not only commercial shipbuilding but naval ship building as well. From 1969 to the present, the number of naval vessels has dropped from 976 to less than 500.

Both a cause and effect of this decline is the decrease in foreign trade carried in U.S. flag ships. Presently, the percentage (in tonnage terms) of American foreign trade carried in U.S. ships is below 6 per cent!

The situation in the fishing industry presents almost as dismal a picture. However, the recent controversy over the "200-mile limit" has somewhat enlightened public opinion as to the status of commercial and recreational fishing. Following World War II, many naval craft were converted to fishing vessels, enabling the U.S. to remain second only to Japan in tonnage. Since 1957, though, our position has declined steadily so that we are now in sixth place. Presently, there exists considerable concern, both economic and ecological, about the limits and potential of the undersea crop. This concern has been magnified by the overfishing of certain waters and species by the U.S.S.R. and Japan.

While the situation seems dismal, some trends portend a better day. Much as Sputnik catapulted the United States into a frantic catch-up in space science, the dramatic growth of Soviet seapower launched a new interest in maritime and naval ship expansion. After years of stagnation, the U.S. commercial shipbuilding industry, stimulated by the Merchant Marine Act of 1970, seems to be entering an era of revitalization, and an extensive House of Representatives report has suggested that "the Navy enter the 1980's with an absolute minimum of 600 ships."

Other hopeful signs of a maritime awakening include a growing interest in marine science; the activity of professional organizations and societies on behalf of the industry; the development of maritime and naval parks and museums; the establishment within museums of maritime exhibits—for example, the Smithsonian's Hall of Maritime Enterprise; the inclusion of gift shops of maritime items; the rise in the sales of manufacturers and distributors of nautical wares; and the expansion of TV shows about the sea, its promise and problems.

These trends stimulate moderate optimism; continued progress in information dissemination will result in an expanded appreciation for the nation's rich, colorful, and immensely interesting maritime tradition.

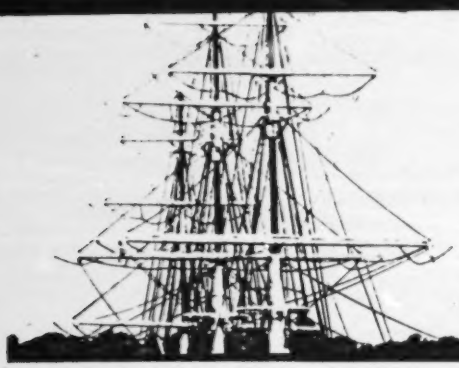
America's Forgotten Maritime Heritage:
Primary Ingredient for Education Programs

by Wm. Ray Heitzmann, Ph.D.
Villanova University, Villanova, Pennsylvania

Test your own maritime heritage I.Q.

1. What percentage of the earth's surface is covered by water? _____
2. What is the number of miles of navigable (depth of 9 feet) waterways in the U.S. (including the Inter-coastal Waterway)? _____
3. Name three expressions that have become part of our language because of the nation's nautical tradition:
   a) _____
   b) _____
   c) _____
4. Name three museums that treat the maritime aspect of the nation's development:
   a) _____
   b) _____
   c) _____
5. What canal (located in the upper Mid-west) by 1930 was handling twice the tonnage of the Panama and Suez combined? _____
6. What is the present number of U.S. Naval vessels? _____
7. What percent of American trade is carried in U.S. flag ships? _____
8. What North American body of water holds the greatest promise of providing energy from tidal power? _____
9. What is the origin of the name of the following towns?
   a) Ship Bottom (N.J.) _____
   b) Nags Head (N.C.) _____
10. What American lakes also boast about a sea monster similar to Loch Ness?
    a) _____
    b) _____
11. Where could one find a map of sunken treasure ships? _____
12. What percent of coastal trade is inland waters trade? _____
13. What is an inexpensive source of prints of ships? _____
14. What percent of the nation's energy is supplied by hydroelectric power? _____
15. Name three peacetime contributions to American society developed by the U.S. Navy _____
    _____
    _____

(Consult page 58 for answers.)



The influence of the world of water has been indelibly imprinted upon the American experience. Art, music, law, literature, finance, and handicrafts all carry the mark of the sea. Unfortunately, this colorful and romantic heritage, encompassing everything from seascapes to surfing to lighthouses, has escaped the attention of most Americans.

This field of knowledge offers the student of marine education numerous opportunities for enjoyable and profitable investigation. Some suggested areas for lessons, mini-units, and units follow:

A. For children in the primary grades, an appreciation of the merchant marine and maritime trade can be gained from the Adopt-A-Ship Plan. Once a class adopts a ship, the students can correspond with the captain and officers. This can be particularly beneficial to teachers in the inland areas of the nation. For particulars write to: Adopt-A-Ship Plan, The Propeller Club of the United States, 1730 M Street, N.W., Suite 413, Washington, D.C. 20036.

B. Two workbooks completed by the author offer the opportunity to increase the awareness of children concerning the maritime sphere and the energy problem. Designed to develop basic skills and to motivate, the books are entitled, *From Sail Power to Nuclear Power: America's Heritage and Energy Education*, Activity Book I and Activity Book II. Interdisciplinary in scope, they contain lessons on topics such as: Energy from the Sea (tidal power, ocean windmills), Lighthouses, Map Skills, Sea Language Crossword Puzzles, Charts of Sources of Oil, Undersea research. The booklets, which easily lend themselves to integration into existing lessons or can be used separately, contain photographs, maps, and illustrations. They may be obtained from Con-Stran Publications, River Park Bldg., Suite 2108, 3600 Conshohocken Ave., Philadelphia, Pennsylvania 19131 at a cost of $3.00.

C. Local and state history can provide content for a maritime unit in communities and regions located on or near bodies of water (which includes most of our nation). Students in inland areas may discover ships named for their localities, or may trace water-transported products to or from their town or city. Frequently, a retired merchant mariner or naval officer may reside in the district and can serve as a resource person and speaker.

D. Fishing, maritime trade, shipbuilding, and water-related sports present the opportunity to investigate enterprises found along coastal areas and in waters. These activities, which predate nationhood, have rich and successful histories and have made important contributions to the nation's development.

E. Often models can serve as springboards to learning experiences. This can be done on an individual or group basis. Down East Crafts (198 Main Street, Yarmouth, Maine 04096) provides inexpensive preassembled kits of lighthouses and wharfs, and Ships-A-Sailing (P.O. Box 4998, Manchester, New Hampshire 03108) has original "Ship in a Bottle" kits (for assembling or completed). These would be particularly good for young or unskilled children. Many hobby stores offer kits (e.g. Revell) for assembling the more sophisticated models. These can also serve as items for display.

F. The abundant architecture, art, literature, and music of the sea taking the form of lighthouses, seascapes, biography, ballads, drama, poetry, songs, and many others offer ample opportunities for the creative educator.

The flexibility and variety of maritime heritage subject matter make it extremely attractive to educators. It serves to motivate and interest persons of all ages. While presently in a period of doldrums, the nation has a rich and colorful nautical tradition. The present is stormy but the future is bright. The "Tall Ships" (Operation Sail) spectacular, the 200-mile limit situation, the Panama Canal controversy, and the growing concern with the fate of the oceans have served to focus the attention of the Americans upon the sea. Other hopeful signs of a maritime awakening include the development of maritime and naval parks and museums; the establishment within museums of maritime exhibits; the inclusion within gift shops of nautical items (paintings, artifacts, handicrafts, objects of art); the rise in the sales of maritime wares; the expansion of television shows about the sea; the continuing interest in the exotic-Bermuda Triangle, Lost Continent of Atlantis, and various other topics; energy and the sea; the search for sunken treasure ships; and the U.S. Navy-Soviet Navy competition and development.

Hopefully, as the nation remembers its maritime heritage, it will have a greater respect and concern for the future of the sea and the inland waters. A bibliography of resources follows:

Periodicals

American Neptune—a research publication of the Salem Peabody Museum. Containing interesting articles of a scholarly nature, this journal provides information on America's maritime history. Peabody Museum, Salem, Massachusetts 01970.

Boating—a popular, nicely illustrated magazine containing historical, contemporary, and how-to articles. Students will find advertisements as well as articles of interest. P.O. Box 2773, Boulder, Colorado 80302.

Cruising—a popular magazine aimed almost totally at readers interested in sailing. Each issue contains articles on technique, possible adventures, tours, and other general sailing-related topics. The illustrations and advertisements will be enjoyed by students. Cruising World Publication, Inc., 524 Thomas Street, Newport, RI 02840.

Oceans—publication of the Oceanic Society, "an education and charitable nonprofit membership organization." This journal, which treats current and historical topics related to maritime affairs in a readable comprehensive fashion, contains excellent and beautifully done photographs, sketches, and illustrations. 240 Fort Mason, San Francisco, CA 94123.

Oceanus—a quarterly investigating and reporting recent findings on the sea. Generally very readable, the topics will interest educators with a concern for the frontier of sea research. Woods Hole Oceanographic Institution, Woods Hole, MA 02543.

Sea Frontiers—a short bi-monthly magazine with articles (illustrated), concerning advances, explorations, and discoveries related to the marine sciences. Published by International Oceano-Graphic Foundation, 10 Pickenbacker Causeway, Virginia Key, Miami, Florida 33149. This organization also publishes *Sea Secrets*.

Sea History—clearly one of the finest periodicals in the field. Each issue contains historical articles as well as current issues of a historical interest (ship restorations). National Maritime Historical Society, 2 Fulton Street, Ferry Landing, Brooklyn, New York 11201.

Sea Power—a publication of the Navy League, "an independent, non-profit, civilian education organization." Recent editions have contained articles (illustrated) on various aspects of maritime life—fishing industry, oceanography, shipbuilding. *Sea Power*, 818-18th Street, N.W., Washington, D.C. 20036.

Shipmate—a U. S. Naval Academy Alumni Association publication which along with articles relative to the Alumni contains well done general features. Alumni Association, Alumni House, Annapolis, Maryland 21402.

Steamboat Bill—a quarterly publication of the Steamship Historical Society of America. This journal contains short, interesting, well-illustrated features on topics such as ferry boats, Mississippi show boats, and other non-naval steamships. Dept. M.S., 101 President Rd., Westwood, New York 07675.

United States Naval Institute Proceedings—publication of the U.S. Naval Institute, "a private, professional society for all who are interested in naval and maritime affairs." Past issues of this journal constitute an excellent primary source of maritime (especially naval) history as the periodical has just celebrated its centennial anniversary. More recent issues deal with current maritime and naval problems. The Institute also publishes books related to naval and maritime affairs. The *Naval Review*, an annual (yearbook), reviews the year's developments and suggests future directions for the Navy, Coast Guard, Marines, and related maritime life (illustrated). U.S. Naval Institute, Annapolis, Maryland 21402.

United States Naval War College Review—a scholarly publication with articles relating not only to the Navy but also to America's maritime industry. Useful for a history of the Navy as well as current thinking on naval problems—strategy, race relations, women in the Navy, etc. Limited distribution, but available at many libraries. U.S. Naval War College, Newport, R.I. 02480.

Warship International—a magazine dealing with naval ships of all types, from various nations and time periods. This periodical is highly illustrated with sketches, pictures, and plans of ships. Appearing quarterly, it is published by the Naval Records Club, 726 North Reynolds Road, Toledo.

Books, Pamphlets, Films, Miscellaneous

Abbott, Sue Sweeney, et al. *Undersea Treasures*. Washington, D.C.: National Geographic Society, 1974. This recent book, containing over 300 pictures, illustrations and maps, provides the reader with an excellent narrative account of the riches to be obtained from the sea. The book is also unique in combining history and oceanography.

Albion, R. G. *Naval and Maritime History: An Annotated Bibliography*. (4th Edition). Mystic, Connecticut: The Marine Historical Association, 1972. An outstanding reference work listing books in all areas of maritime history (navies, safety at sea, original seafaring accounts, whaling, sea routes). This work contains 5,000 entries and is a must for any library.

Albion, R. G., W. A. Baker and Benjamin Labaree, *New England and the Sea*. Middletown, Connecticut: Wesleyan University Press, 1972. Essentially a history of the region and its relationship with the sea. Listed here because of its appeal to all readers. Contains many photographs that enrich the romantic maritime history of the area.

Alone in My Lobster Boat. Xerox Films, 245 Long Hill Road, Middletown, Connecticut. A twelve-year old boy is permitted to be his own man for one day. In this sixteen minute color film, a young boy is taught the responsibilities, the difficulties, and the costs of a Maine lobster fisherman, his father's profession.

Americana: Yankee Whaling. Audio-Visual Center, Indiana University, Bloomington, Indiana. A twenty-seven minute black and white film that takes the viewer on a tour of one of the last remaining 19th Century whaling ships at Mystic, Connecticut. The film (1968) contains actual scenes of harpooning, cutting, and burning of blubber.

Barlow, A. M. *Ferryboat*. New York: Dramatist Play Service, 1974. This play details the chance meeting of two young people on a ferryboat. (One man, one woman, one exterior.)

Bibliography on the History of Water Transportation. Washington, D.C.: Smithsonian Institute, 1965. This bibliography, although dated, exists as a fine compilation of books on ships, mariners, inventors, discoverers, ports, and maritime lore.

Big Load Afloat. American Waterways Operators, Inc., 1965. An excellent small book valuable to the reader because of its emphasis on the inland waters. Contains several maps on the nation's major waterways.

Bradford, Gershom. *The Mariner's Dictionary*. New York: Weathervane Books, 1952. Containing many illustrations and non-technical explanations of the terms. This reference work should become part of the library of those with an interest in the sea.

Bryant, Samuel W. *The Sea and the States: A Maritime History of the American People*. Gloucester, Massachusetts: Peter Smith, Publisher, Inc. 1974. The historical account of the development of the Navy and Merchant Marine in the United States.

Down East Crafts. A company that provides prepared "Do It Yourself Kits"; some need only to be put together, others need minor sanding and painting. These relatively inexpensive kits (lighthouses, shrimpboat, schooner, and others) serve as excellent hands-on springboards into other activities or as the focus of a bulletin board display. 198 Main Street, Yarmouth, Maine 04096.

Erie Canal. BFA Educational Media, 2211 Michigan Avenue, Santa Monica, Ca. The history of the canal is traced through the use of old photographs and drawings in this seventeen-minute color film; the film emphasizes the contribution of the canal to the growth of America.

Exploring America 1977. New York: CBS Radio Network. A series of short broadcasts that appeared on Saturday, April 16, and Sunday, April 17, 1977. With Charles Kuralt narrating, the programs detail all aspects of the world of water. A transcript is available.

Goldin, Augusta. *The Sunlit Sea*. Toronto: Fitzhenry and Whiteside, 1968. A wonderful book for young children; it will intrigue them because of the content and illustrations (by Paul Galdone).

Great Lakes Ports of North America. Ann Arbor, Michigan: The Lesstrang Publishing Corporation. A well illustrated book on the 22 deep-water ports that lie within the Great Lakes and the St. Lawrence Seaway. The aerial photographs and the information on the ports make this a useful book.

Groenen, L. *Illustrated Marine Encyclopedia*. Toronto: George J. McLeod, Ltd., 1948. Although a good reference work, it is somewhat dated.

Harbor Pilot. BFA Educational Media. The experience and knowledge of the harbor pilot are portrayed in this ten-minute color film, which shows how the skills of the pilot enable him to safely guide ships into port.

Hass, Hans. *Men Beneath the Sea*. New York: St. Martins, 1975. A readable, illustrated book by a well-known diver and writer. Contains many first-hand accounts.

Heitzmann, W. Ray. "America's Maritime Heritage: A Bicentennial Treasure." *Social Education*, October, 1975. The author offers teaching suggestions as well as a bibliography of materials and museums for instruction. It can be shared with teachers contemplating units and lessons on maritime studies.

_____. *From Sail Power to Nuclear Power: America's Maritime Heritage and Energy Education*—Activity Book I, Activity Book II, Short, well-illustrated publications designed for students, grades 5 to 12. These booklets offer high interest motivational topics with many illustrations. Con-Stran Publications, River Park Building, Suite 2108, 3600 Conshohocken Avenue, Philadelphia, Pennsylvania 19131.

Heritage and Horizons. Washington, D.C. Department of the Navy. A film produced recently for the bicentennial lists recent naval activities with excellent historical footage of war and peace-time events.

Canals: Towpaths West. Pennsylvania State University AV Services, Willard Bldg. University Park, Pa. A seventeen-minute film detailing the purpose and technical aspects of the early canals.

Captain Stormalong. BFA Educational Media, 2211 Michigan Avenue, Santa Monica, California. This thirteen-minute color film details the adventures of one of America's favorite sea captains in the days of wooden ships. The film covers Stormy's life from a cabin boy on a schooner until he becomes captain of the *Courser*, the largest of the clipperships.

Catalog of United States Coast Guard Films (Annual). Washington, D.C.: U.S. Coast Guard. An annotated bibliography of 33 films available from the U.S. Guard. The Navy's Recruiting Command also provides films.

Chapelle, H. I. *History of Sailing Ships*. New York: Norton, 1935. This work by a naval architect deals primarily with ship design. This outstanding work contains chapters on topics such as revenue cutters, sailing yachts, and naval craft.

Chatterton, E. K. *Old Sea Paintings: The Story of Maritime Art as Depicted by the Great Masters*. 1928. New York: Dodd. This work contains many excellent paintings.

Church, W. C. *Life of John Ericson*, (2 volumes). New York: Holt. The biography of the famous architect and engineer best known for building the *Monitor*. A more recent biography is R. M. White's *Yankee from Sweden*, 1960. New York: Holt, Rinehart and Winston, Inc.

Clark, J. "Sun Ship Also Rises," *Philadelphia Magazine*. (Reprints available from Sun Shipbuilding Company, Chester, Pennsylvania.) A well done article on the Sun Shipbuilding Company. The article summarizes the decline of the shipbuilding industry as well as the history of Sun Company. Also available, "How Ships Are Built."

Coast Guard History. Washington, D.C.: U.S. Coast Guard Public Information Division (CG-213). A short booklet summarizing the history of the Coast Guard from its days as the revenue marine and the revenue cutter service. The booklet contains many historic and contemporary illustrations.

Cooper, Elizabeth K. *Science on the Shores and Banks*. New York: Harcourt, Brace and World, 1960. A good first book for early adolescents that introduces the reader to many aspects of sea life.

Cutler, C. C. *Greyhounds of the Sea: The Story of the American Clipper Ship*. New York: Putnam, 1930. Information on the ships of one of the most romantic periods of maritime history. Data on owners, speed, and construction.

Dana, R. H. *Two Years Before the Mast*. (1840) New York: Signet Classics, 1964. One of the great classics of maritime life aboard ship. Dana interrupted his studies at Harvard to ship aboard a Boston brig to California. His commentary of life aboard ship made it a classic.

Historically Famous Lighthouses. Washington, D.C.: U.S. Coast Guard Public Information Division (CG-232). An 88-page booklet containing information on lighthouses located in the coastal and Great Lakes states as well as Hawaii. The booklet contains a picture and short history of each of the lighthouses. As lighthouses form a romantic and interesting part of our nation's maritime heritage, this booklet provides a useful and enjoyable account of part of that heritage. The Coast Guard offers several booklets.

Hooper, E., Allard, Dean C. and Oscar Fitzgerald. *The United States Navy and the Vietnam Conflict*. Washington, D.C.: Naval History Division, Department of the Navy, 1976. This organization produces many well-written books on naval history that can serve as fine references.

Huntress, Keith. *Narratives of Shipwrecks and Disasters*. Ames, Iowa: Iowa State University Press, 1974. This work covers the 275 years (1586-1860) when wooden sailing ships were in their Golden Age. Specifically, the author relates the story of the destruction of 24 ships.

Inches, H. D. *The Great Lakes Wooden Shipbuilding Era*. Vermilion, Ohio: Great Lakes Historical Society, 1962. An account particularly useful to teachers of the upper Middle West wishing to integrate some local maritime history into their courses.

Inland Waterways-Inland Ports. Arthur Barr Productions, P.O. Box 7-C, Pasadena, California. This fifteen minute film depicts the importance of water transportation. The film shows a large sea going freighter's journey to an inland port to deposit its cargo. The port activities (exchange of goods—barges, trains, trucks, ships) are shown.

Jobe, J. *The Great Age of Sail*. New York: Time-Life. 1967. A nicely illustrated and well-written popular account of the days when sail was king on the seas.

Johnson, David. *Clipper Ships and the Cutty Sark*. New York: Grossman Publishers. This collection of primary sources, sketches, and narrative accounts of the clipper ships is part of the Jackdaw Series. It is useful in discovery-inquiry lessons or for just posting on bulletin boards.

Kaufman, Betsy B. "The Planning of the Multimedia Study: Man's Interest and Fascination with the Sea," *Journal of English Teaching Effectiveness*, 1973. This article is useful to the teacher wishing to approach maritime studies in an interdisciplinary manner. The author lists several valuable books (fiction and non-fiction) for use with students.

Kemp, Peter. *The Oxford Companion to Ships and the Sea*. London: Oxford University Press, 1976. One of the most comprehensive, well done reference works available; really a must.

Kennedy, Ludovic. *Pursuit*. New York: Pinnacle Books, 1975. A scholarly and very readable account of the chase and sinking of the *Bismark*. This analysis benefits from material only recently made available (1973) and conveys the drama of the chase.

Kimmel, H. E. *Admiral Kimmel's Story*. Toronto: S. S. Reginald Sanders & Co., Ltd., 1954. Kimmel, naval commander at Pearl Harbor, defends his actions prior to the attack by the Japanese.

Knight, F. *The Sea Story, Being A Guide to Nautical Reading from Ancient Times to the Close of the Sailing Ship Era*. London: Macmillan, 1958. A valuable guide to fiction. The author, a retired British ship captain, suggests reading in various categories.

Laing, Alexander. *American Heritage History of Seafaring America*. New York: American Heritage Press, 1974. An outstanding chronicle of our nation's seafaring heritage containing 329 illustrations. This book exists not only as a valuable reference work but as a source of maritime art, paintings, engravings, scrimshaw, and prints.

Lewis, C. L. *Books of the Sea, An Introduc-*

tion to Nautical Literature. Annapolis Maryland: U.S. Naval Institute, 1943. Includes both critical reviews and listings of works—novels, short stories, poetry, plays. Examples of chapters: Naval History, Ships and Merchant Marine, Biographies (of seaman, pirates, mutineers, and slavers).

Life in an Eastern Seaport Town 1870. ACI Media, 35 West 45th Street, New York, N.Y. 10017. Although somewhat narrative, this film contains an abundance of information on life in a whaling town; filmed in Mystic, Nantucket, and New York, the photography enhances the production.

Life on the Sea Shore. England: B.P.C. 1969. A short reference book for youngsters that provides definitions as well as illustrations of each topic.

Lloyd, C. *Ships and Seaman: From The Vikings to the Present Day. A History in Text and Pictures*. Cleveland: World Publishing, 1961. The author has culled a fine collection of pictures to complement his text.

Lord, W. *A Night to Remember*. New York: Holt, 1955. This book describes the sinking of the great White Star liner, Titanic, on April 15, 1922 with the loss of 1,198 lives.

Lott, A. and E. Engle. *America's Maritime Heritage*. Annapolis, Maryland: U.S. Naval Institute, 1975. A high school textbook, the first of its kind, directed at students in the NJROTC Program. Lavishly illustrated, it provides a host of information both for the teacher and student.

MacDonald, R. N. *Using Tools-Whaling*. Cambridge, Massachusetts: Educational Development Center, Inc., 1974. A unit in the curriculum project, "People and Technology," focusing on a case study investigation of a highly developed craft technology. The experimental unit contains many types of good instructional materials and media (a film, film-strips, a simulation game, artifacts, primary sources, a poster, a model ship construction kit). The unit contains the ingredients for interesting, interdisciplinary student-oriented lessons based upon whaling life in early Nantucket. Many of the materials can be displayed.

Marx, Robert. *Shipwrecks of the Western Hemisphere*. A delightful introduction to underwater archeology, treasure hunting, and skin diving in the sea.

McClung, Robert. *Treasures in the Sea*. Washington, D.C.: National Geographic Society, 1972. An excellent book for the younger child containing many fine photographs and graphics and a minimum of printed information.

McCosker, M. S. *The Historical Collection of Insurance Company of North America*. Philadelphia: Insurance Company of North America, 1967. This book contains an annotated list of marine paintings, prints, books, records, ship models, and other memorabilia contained in the company's collection, which is located in libraries around the country. In addition, the book contains many beautiful illustrations of the above.

McFee, William. *The Law of the Sea*. Philadelphia: Lippincott, 1950. The author has written a summary of the historical development of maritime law.

Merrill, J. *Quarterdeck and Fo'c'sle: The Exciting Story of the Navy*. Chicago: Rand McNally, 1963. A collection of primary sources (reports, logs, letters) from the Revolution to the present. Excellent for use by students in present or abbreviated form.

Port of Duluth-Superior. Duluth, Minn.: Seaway Port Authority. This is a short illustrated booklet dealing with the ports of Duluth and Superior. Duluth as the nation's number one port (in tonnage) deserves the attention of the student of American studies and maritime affairs. All major ports and most minor ports have such publications available free.

Potter, E. B., and C. W. Nimitz. *Sea Power: A Naval History*. Englewood Cliffs, New Jersey: Prentice-Hall, 1960. This volume, the text used at Annapolis and most of the NROTC programs, provides a comprehensive history.

Propeller Club of the United States, 1730 M Street, N.W., Suite 413, Washington, D.C. 20036. This organization promotes many maritime activities—American Merchant Marine Conference, "Adopt-A-Ship" Plan for school children, and the "National Maritime Essay Contest" for high schoolers.

Revell, Inc., Venice, California 90291. Several challenging models (*Mayflower, Cutty Sark, Eagle*, others) will provide both the job of construction and display.

Seamanship. New York: Time-Life Books, 1972. One of the outstanding Time-Life Library of Boating Series. This as the others are renown for their detail and illustrations.

Seaword. Maritime Administration, U.S. Department of Commerce, 14th and E Streets, N.W. Washington, D.C. 20230. A newsletter providing recent developments in the maritime industry.

Selected Oceanographic Publications. Washington, D.C.: U.S. Government Printing Office. A short annotated bibliography of publications available from the U.S. Government Printing Office. These publications are generally short essays and booklets.

Ships A Sailin'. P.O. Box 4998, Manchester, N.H. 03108. This company provides models in kits or completed form, ships in the bottle using the original method used by early American mariners. These can serve as excellent items for display.

Ships Through the Ages. Coastal/Oceanic Awareness Studies. School of Education, University of Delaware. This mini-unit explores the history of maritime exploration from log boats to the clipper ships. While most items in this series are marine science oriented, several do treat the humanities.

Snow, E. R. *Incredible Mysteries and Legend of the Sea*. New York: Dodd Mead and Company, 1966. Snow, the author of many books about the sea, provides the reader with several extremely interesting stories. His books will be found attractive to readers of all ages particularly because of the nation's curiosity concerning the exotic.

Songs and Sounds of the Sea. Washington, D.C.: National Geographic Society, 1973. (Stereo-recorded). A collection of American folk songs related to the sea. These songs, mingled with the sounds of the sea, were sung by the hardy men who form America's maritime tradition.

Spectorsky, A. C. (Ed.) *The Book of the Sea*. New York: Appleton, 1954. This is an anthology containing 83 well-chosen selections. This massive work of 488 pages contains many excellent illustrations.

Stackpole, E. A. *The Sea Hunters*. Toronto: Lippincott, 1953. Stackpole's account of early American whaling is the most authoritative publication on the topic.

Meyers, Judith. *Waldo the Whale*. Mystic, Connecticut: Education Department, Marine Historical Association. A short booklet designed for upper elementary school students dealing with sharing in an educational and humanistic fashion. The educational department of the Marine Historical Association is one of the few organizations producing educational materials.

Miller, Nathan. *U.S. Navy: An Illustrated History*. Annapolis, Md.: U.S. Naval Institute Press and New York: American Heritage Publishing Co., 1977. Lavishly illustrated, this will easily become the most popular work of its type on our nation's navy.

Mississippi River Navigation. Vicksburg, Mississippi: Mississippi River Commission, 1971. A booklet containing a significant amount of information on the river. In addition to a history of the river, maps, charts, and pictures are included.

Menard, H. William and Jane L. Scheiber (eds.). *Oceans*. Del Mar, California: Publishers, Inc., 1976. A book of readings that contain an excellent selection of articles on every aspect of the maritime sphere.

"Naval and Maritime Prize Photography" Contest Winners. U.S. Naval Institute, Annapolis, Maryland 21402. A reprint booklet of photographs that have won the yearly contest sponsored by the U.S. Naval Institute. Photographs (color and black and white) are of framing quality. The Institute, with a collection of several hundred thousand pictures, also is a prime source of photographs of ships.

Navy, Marine Corps, and Coast Guard. Washington, D.C.: Government Printing Office. A listing (some annotated) of government publications concerning the Navy, Marines, and Coast Guard. These publications include topics such as safety, military law, astronomy, radar, and oceanography.

Ocean Freighters. Philadelphia: Curriculum Materials Corporation. Extremely valuable filmstrip for young children; it dis-

cusses topics such as tugboats, wharfs, anchors, lighthouses. This organization offers several, good but dated, maritime filmstrips.

"*Old Navy I, II Portfolio.*" Washington, D.C.: The National Archives. These are outstanding prints from the Franklin D. Roosevelt collection reproduced in color on quality paper at a reasonable cost that can be used for displays and bulletin boards.

O'Neill, Eugene. *The Complete Works of Eugene O'Neill*. New York: Random House, 1941. This collection contains many plays with a maritime setting (aboard a barge, a transatlantic liner, and merchant ship) and with maritime themes (death at sea, loneliness, frontier). O'Neill, one of America's great playwrights, chose the sea as the setting for many of his plays.

Operation Rescue—Cleaning and Care of Oiled Waterfowl. Washington, D.C.: American Petroleum Institute. A booklet provoked by the criticism of oil spills and their effects tells of the development of techniques to treat birds that have come in contact with oil. The publication is not only interesting for its treatment of this topic but for its discussion of water pollution (by oil) in general.

Ortzen, Len. *Strange Mysteries of the Sea*. London: Arthur Barker Limited, 1976. Well-written stories that will hold the reader's interest and provide an insight into the lore of the sea.

Steamboat Bill. BFA Educational Media. The film relates the tale of the famous riverboat captain, beginning with Bill's days in Council Bluff, Iowa, when he was determined to become "the most famous riverboat captain." This 11-minute color film portrays the lure of the rivers.

"Treasure Maps and Charts." *Social Education*, Vol. 35, No. 1, December, 1971. An annotated bibliography of treasure maps and charts listing locations of sunken ships. The bibliography lists addresses for obtaining the maps.

Villiers, Captain A. *Men, Ships and the Sea*. Washington, D.C.: National Geographic Society, 1972 (new edition). This is clearly one of the outstanding pictorial and narrative accounts of the historical development of ships. It contains chapters such as "Medieval Marines Enrich Coasts with Commerce," "Yankee Merchants Tap China Trade," "Steamboats a-Comin'," "Dreadnoughts and Blue Ribbon Liners," and "Small Boating: Everybody's Sport."

United States Merchant Marine—A Brief History. Washington, D.C.: U.S. Department of Commerce Maritime Administration, 1972. A short (seven pages) booklet explaining the history of the Merchant Marine, describing its role and importance in the country's development. A well-written concise essay with illustrations.

United States Naval History: A Bibliography. Washington, D.C.: Naval History Division, Department of the Navy, 1972. This is an extensive bibliography of writings (reports, books, pamphlets, articles) on the Navy and all its activities (armament, strategy, tactics, history, periodicals, research aids).

"United States Navy Lithographs." Washington, D.C.: Government Printing Office. These six sets deal with notable highlights and battles, the evolution of officers' and enlisted men's uniforms, and recruiting posters. Relatively inexpensive, they are suitable for bulletin board use or framing.

Whitney, Didley and Nancy Wood. *The Lighthouse*. New York: New York Graphic Society, 1975. Using almost 300 photographs (over 100 in color), the author has captured the beauty and history of this unique style of architecture.

Wilmerding, John. *History of Marine Painting*. Salem, Massachusetts, Peabody Museum, 1968. An excellent reference—really a classic.

Naval and Maritime Museums

I have prepared a list of museums that can provide valuable field trip learning experiences for teachers and students. If you are interested in obtaining a copy, please write me at Villanova University, Villanova, PA 19085. The abridged list has evolved from the *U.S. Naval Institute Proceedings* (October, 1966), *Marine Museums in the United States*, and personal observations.

Answers to Quiz:

1. Approximately seventy (70) percent of the planet's surface is covered by water; we are indeed a water planet.
2. Approximately 25,000 miles—surely a significant number.
3. a) "Blubber"—adopted from the early whaling industry.
   b) "Windfall"—originally used to describe certain trees felled by storms during the colonial era. There were certain trees marked only to be used by the English Navy as masts; the colonists were prohibited from touching the trees unless nature uprooted them. Consequently, good fortune became known as a windfall.
   c) "An *ironclad* alibi"—taken from the Civil War monitors meaning impervious; thus an alibi that can't be broken.
4. a) San Francisco Maritime Museum.
   b) Philadelphia Maritime Museum.
   c) Patriot's Point Naval and Maritime Museum (Charleston, S.C.).
5. The "Soo" Canal (Sault St. Marie Canal).
6. Approximately 475 (and slowly increasing).
7. Approximately 5 per cent.
8. Bay of Fundy (far northeast United States).
9. a) During the sinking of a ship off the coast of Long Beach Island (20 miles north of Atlantic City, N.J.), a baby was placed in the bow of the ship. When the broken and damaged ship beached, cries of a baby were heard. The child was removed and the town was named after the incident.
   b) A favorite hobby of certain coastal residents was to tie a lantern to the neck of a horse (preferably a lame one) and walk the animal along the beach. This strategy was designed to make ships at sea believe it was safe to move closer to shore (incorrectly believing it was a ship they had seen between themselves and land). Often this resulted in a beached ship whose cargo fell prey to the inhabitants; in some locations, this became a virtual occupation. Thus the North Carolina town received its name.
10. a) Lake Champlain (Vermont).
    b) Payette (Idaho).
11. The Library of Congress publishes such a list; a specific source is F.L. Coffman Machinkaw City, Michigan, owner of maps developed by Caribbean Instruments Co., 5106 N. Poinsetta Avenue, West Palm Beach, Florida.
12. Approximately sixty per cent.
13. "Old Navy I, Portfolio"—The National Archives.
14. Approximately 2 per cent.
15. Weather forecasting, fiberglass development, undersea habitat research.

AMERICA'S MARITIME HERITAGE:

From Sail Power to Nuclear Power

BOOK I

by

Wm. Ray Heitzmann, Ph.D.

AN ENERGY EDUCATION ACTIVITY BOOK

Published by:
Con-Stran Productions
River Park Building, Suite 2108
3600 Conshohocken Avenue
Philadelphia, Pa. 19131

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3. Most freight on the inland waters moves in barges. Groups of these are either pulled or pushed by towing vessels. The capacity of the barges generally falls between 500 and 3,000 tons; they carry both liquid and dry. In terms of energy, utilization, this is the most efficient mode of transportation:

water freight - 500 BTU per ton-mile
rail freight - 750 BTU per ton-mile
pipelines - 1,850 BTU per ton-mile
trucks - 2,400 BTU per ton-mile
air cargo - 6,300 BTU per ton-mile

In relation to air cargo, how many times more efficient is water freight per ton-mile? _____

4. The United States has over 25,000 miles of navigable inland waterways. The following chart explains the length and depth of these waterways.

Area	Depth					
	Under 6 ft.	6 to 9 ft.	9 to 12 ft.	12 to 14 ft.	14 ft. and over	Total
Atlantic Coast	1,426	1,241	584	938	1,581	5,768
Atlantic Intra-Coastal Waterway (Norfolk, Va. - Key West, Fla.		65	65	1,104		1,234
Gulf Coast	2,055	647	1,133	79	378	4,292
Gulf Intra-Coastal Waterway (St. Marks River, Fla. - Mexican Border)				1,137		1,137
Mississippi River System	2,020	969	4,957 237	740	268	8,954
Pacific Coast	730	498		26	2,084	3,575
Great Lakes	45	89		8	348	490
Others (excluding Alaska)	76	7		1	7	91
Grade Total	6,352	3,516	6,976	4,033	4,666	25,543

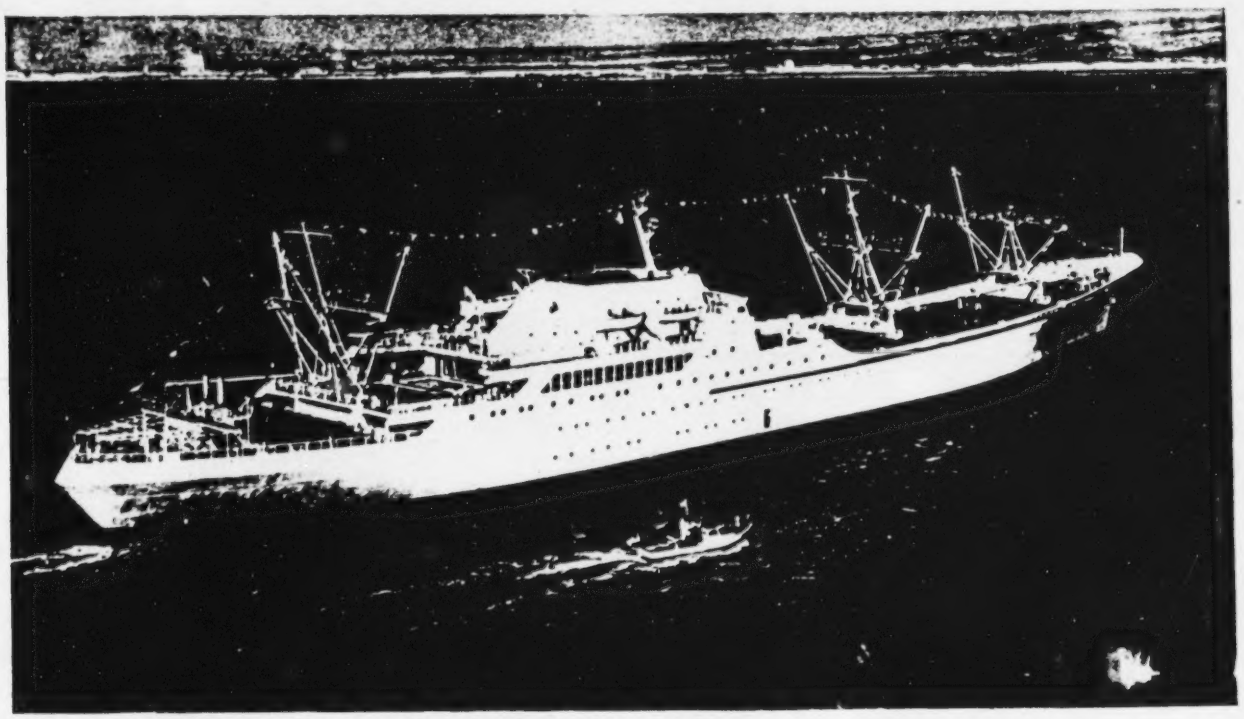
If you were piloting a boat that needed a depth of 11.5 feet of water in which to travel, how many miles of navigable waterways would be safely available to you? _____ If you lived in the Pacific coastal area, how many miles would be available to you? _____

DAILY NEWS, TUESDAY, JANUARY 4, 1977

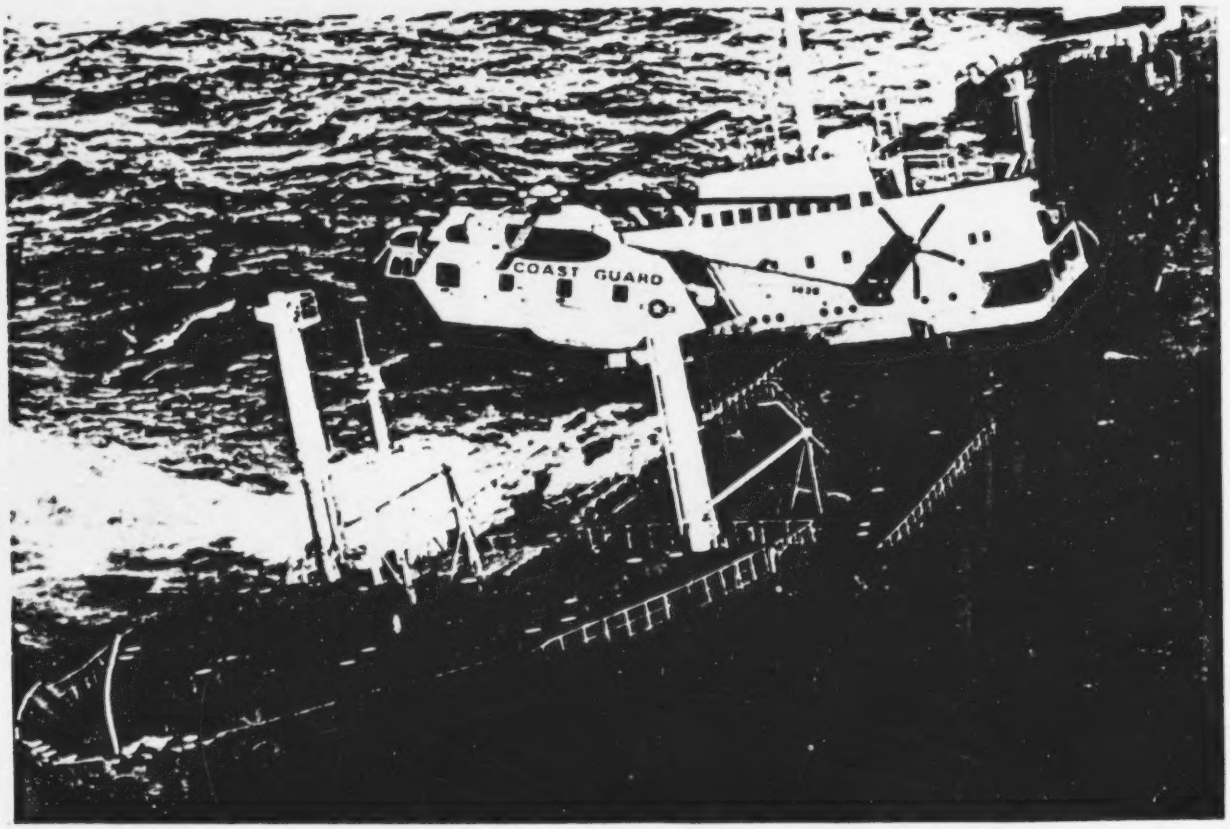
Energy Education "Believe It"

In the Bay of Fundy (Maine), the tides rise as much as 50 feet! A tidal generating plant, if built, could yield 7 1/2 billion KWH -- enough to provide power to 700,000 homes!

9. Choose one of the topics related to the subject of this book (America's Maritime Heritage and Energy) and draw a cartoon below.



SS SAVANNAH (U.S. Nuclear Merchant Ship)
(First Nuclear Merchant Vessel in the World)



ARGO MERCHANT (Liberian Oil Tanker) (Off Nantuket, Mass.) Official U.S. Coast Guard Photograph (Photographed December 15, 1976)

ENERGY AND THE ENVIRONMENT

Unfortunately some of the recreational activities of Americans today have been slowed or changed because of the problems of water pollution and scarcity of certain sources of energy.

1. What are two sources of water pollution? a. _____

   b. _____

2. What two activities does this effect?

   a. _____ b. _____

3. What two effects does the lack of energy have on water-related recreational activities? a. _____

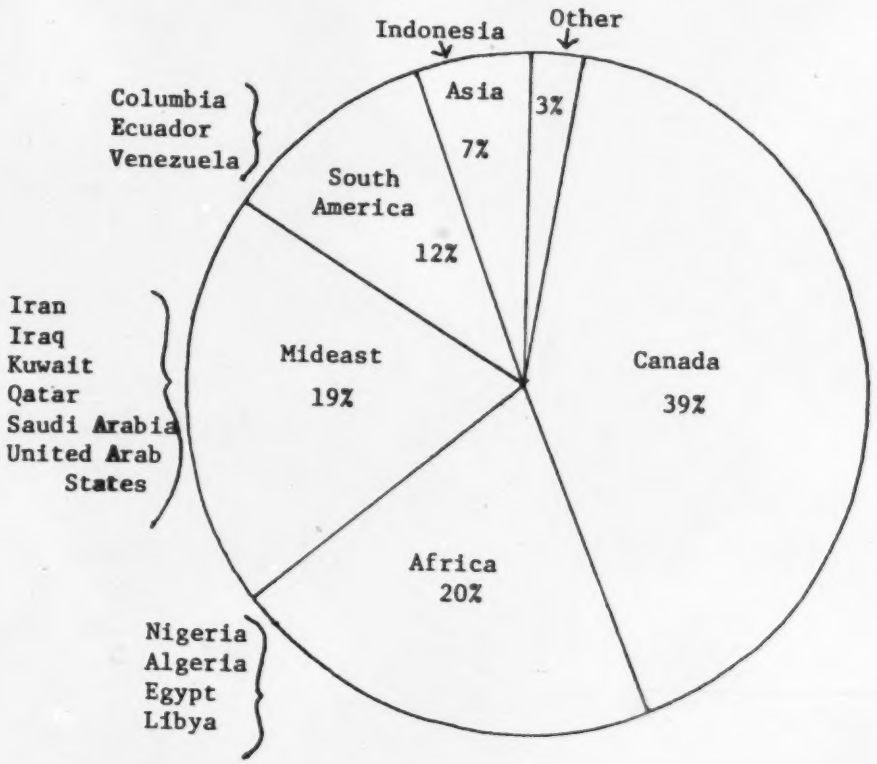
   b. _____

4. The picture above shows the Argo Merchant, a large oil tanker, about to split in half and sink. This tragedy, along with several others like it, captured the attention of all Americans.

What two suggestions can you suggest to avoid situations like the above? a. _____

b. _____

5. The United States imports oil using large tankers, pipe lines, tank trucks and barges accounting for almost fifty (50) per cent of the nation's consumption.



Using the above answer the following questions.

a. Locate on a map all of the countries from which the U.S. obtains oil.

b. How much oil comes from Africa, Asia and Latin America combined?

_____.

c. Which country provides the most oil? _____

AMERICA'S MARITIME HERITAGE:

From Sail Power to Nuclear Power

BOOK II

by

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ENERGY AND THE SEA: NEW SOURCES

The future of the United States is closely related to the solution of providing energy. One of the most important problems facing the nation and all its citizens is finding alternate forms of and new sources of energy and using these in our homes, schools, offices, factories, stores, and transportation vehicles. In addition, everyone must learn to use less outside energy in their own lives.

1. There exist essentially two kinds of energy - continuous and non-renewable. The following is a list of energy sources; underline those that are continuous:

a) coal
b) tidal
c) oil
d) geothermal
e) hydroelectric
f) ocean currents
g) nuclear
h) wood
i) wind
j) solar
k) ocean thermal

2. From the list above choose those energy forms that are either directly or indirectly related to water: _____

_____

_____

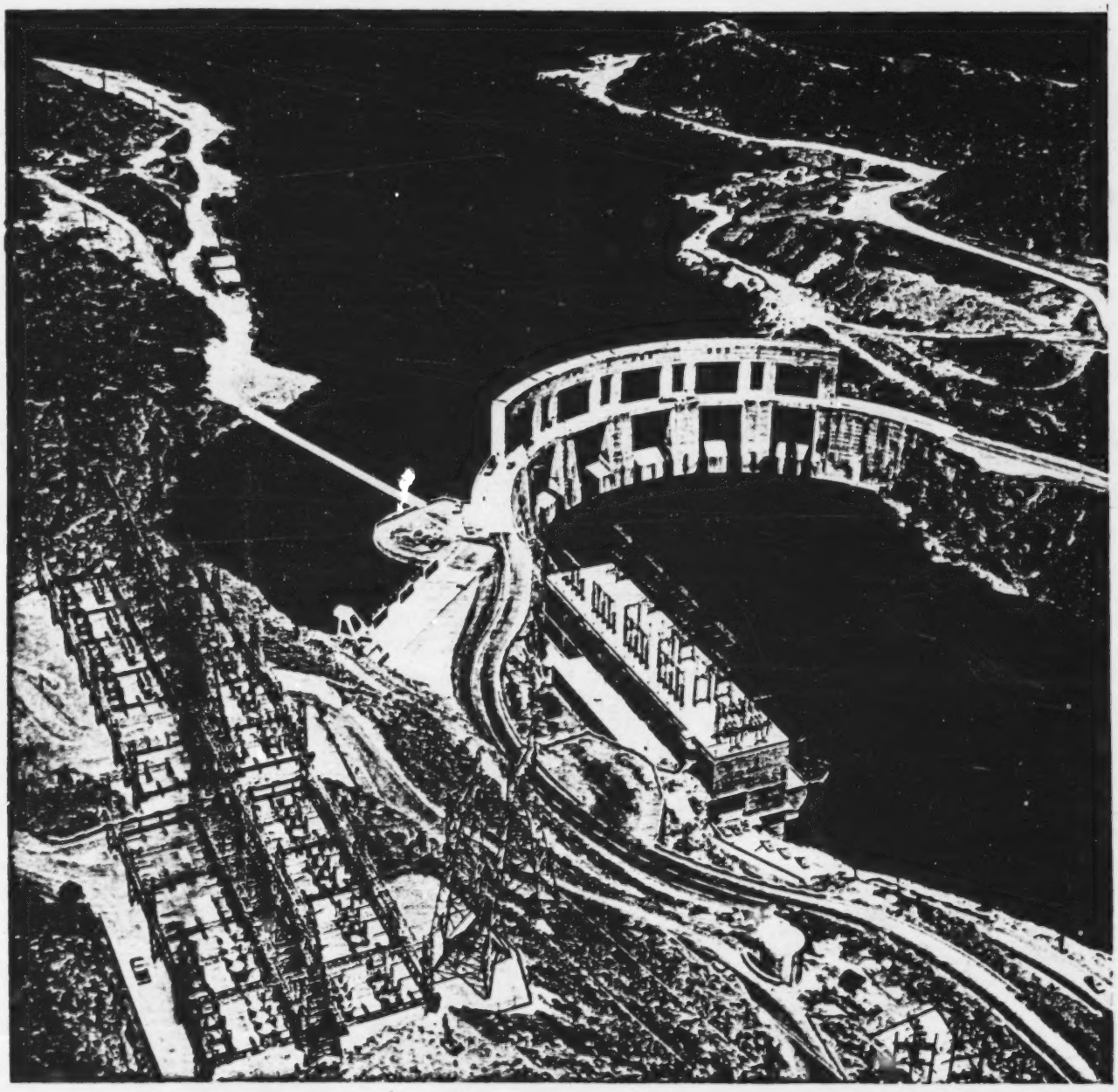
3. Water has provided power since the beginning of people's activities on earth. For example, when manufacturing first began, streams and rivers provided the energy to curn waterwheels for factories. Hydroelectric power presently provides only a small part of the nation's energy needs. What is hydroelectric power? _____

_____

_____

_____

HYDROELECTRIC POWER - WATER ENERGY



Parker Dam Arizona U.S. Department of the Interior (photograph)

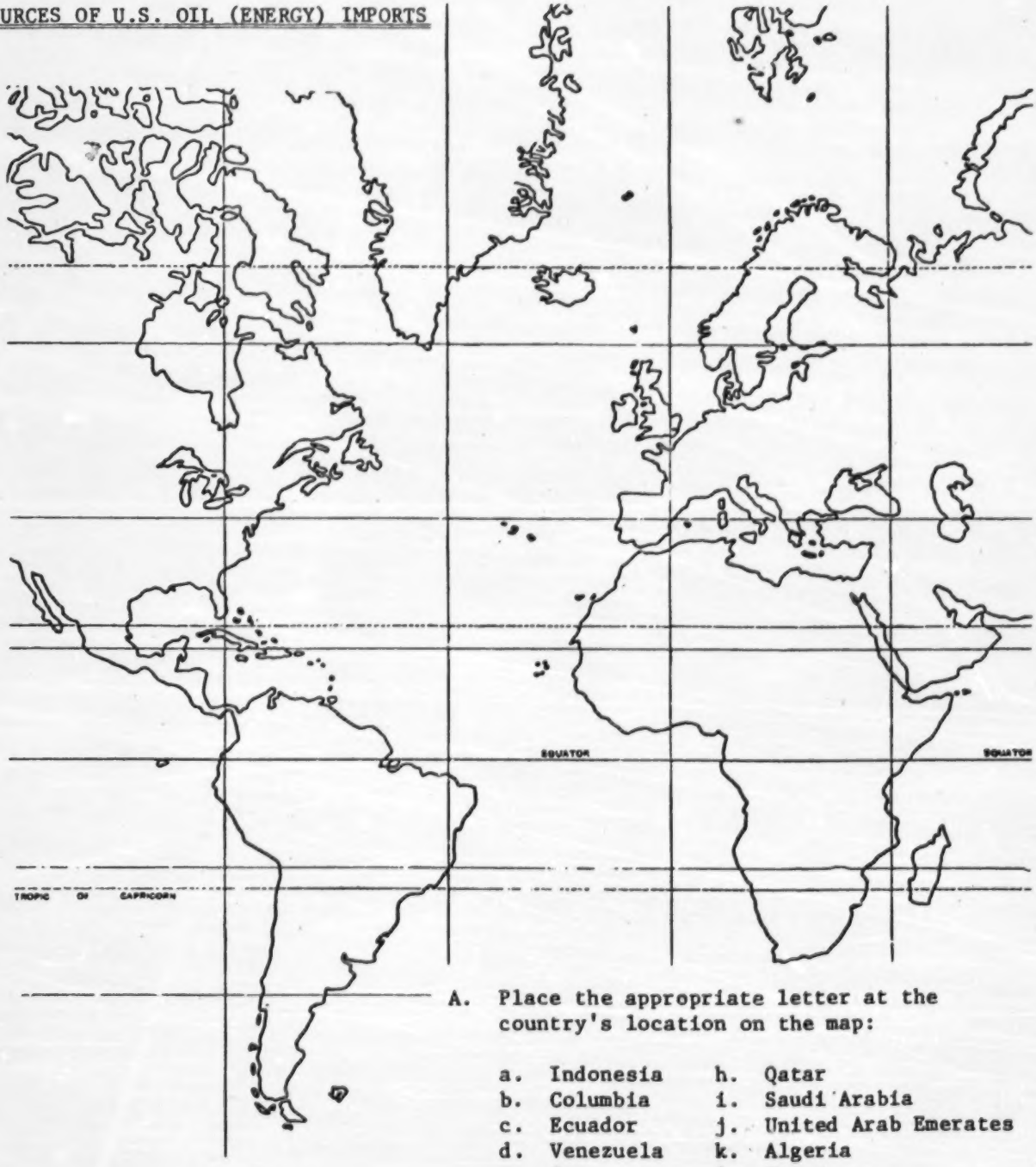
This dam, located on the Colorado River, serves several purposes. List three values of a project such as this: _____

_____

_____

_____

SOURCES OF U.S. OIL (ENERGY) IMPORTS

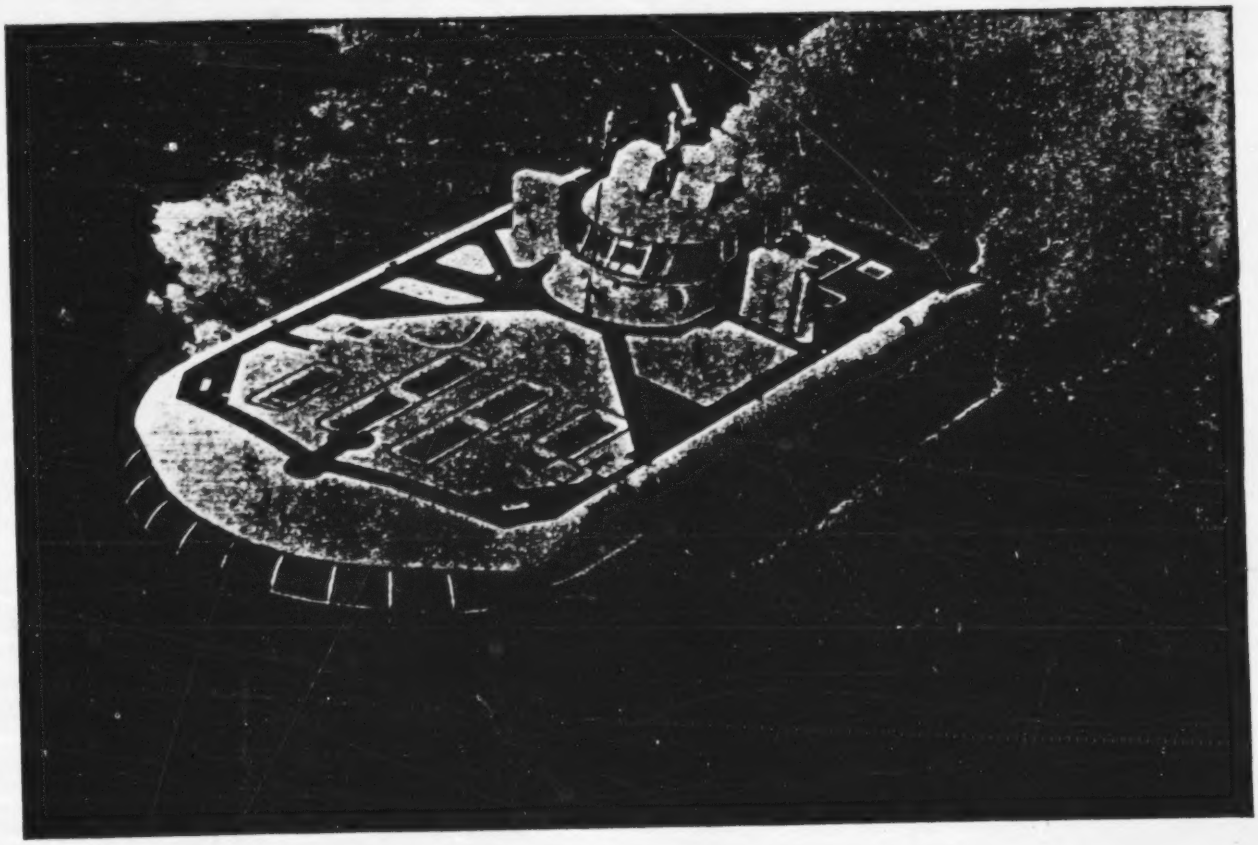


A. Place the appropriate letter at the country's location on the map:

a. Indonesia	h. Qatar
b. Columbia	i. Saudi Arabia
c. Ecuador	j. United Arab Emerates
d. Venezuela	k. Algeria
e. Iran	l. Egypt
f. Iraq	m. Libya
g. Kuwait	n. Nigeria

B. What implications do the sources of oil have for U.S. sea power?

WATER TRANSPORTATION AND ENERGY CONSUMPTION



U. S. Navy Surface Effect Ship U. S. Navy Photograph

The above ship was photographed as she engaged in high speed practice off Panama City, Florida. The ship set a record speed of 103.038 miles per hour (June 30, 1976). While today's ships generally run faster, they also cost more to operate than sailing ships. Why? _____

_____

Do you think sailing ships may become popular again? Why? Why not? _____

_____

_____

Why is it less expensive to run a sailing ship than a steam ship? _____

_____

_____

_____